Fishway and Counting Fence Operations in Newfoundland and Labrador, 1949-79

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Canadian Data Report of

Fisheries and Aquatic Sciences 477

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by

R. B. Moores and E.G.M. Ash

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ABSTRACT

Moores, R. B., and E.G.M. Ash. 1984. Fishway and counting fence operations in Newfoundland and Labrador, 1949-79. Can. Data Rep. Fish. Aquat. Sci. 477: v + 123 p.

The migration of Atlantic salmon adults and smolts and other fishes have been monitored periodically on selected rivers in Newfoundland and Labrador since 1949. Monitoring was conducted at fishways and also at fish counting fence or weir installations. The data obtained at these facilities from 1949 to 1979 are presented. A summary of angling data is also given for each river.

RÉSUMÉ

Moores, R. B., and E.G.M. Ash. 1984. Fishway and counting fence operations in Newfoundland and Labrador, 1949-79. Can. Data Rep. Fish. Aquat. Sci. 477: v + 123 p.

Depuis 1949, la migration de saumons de l'Atlantique adultes et juvéniles ainsi que d'autres espèces de poisson a fait l'objet d'une surveillance périodique dans certaines rivières de Terre-Neuve et du Labrador. Cette surveillance s'est effectuée au niveau d'échelles à poissons ainsi qu'au niveau de barrages de dénombrement de poissons ou d'installations de pêche à fascines. On présente les données recueillies à ces installations de 1949 à 1979. On donne également pour chaque rivière un résumé des statistiques de pêche à la ligne.

INTRODUCTION

Reports have been published annually on the fish enumerated at fishways and fish counting fences in Newfoundland and Labrador, 1949-79 (Anon. 1949-1969b; Peet 1966, 1968, 1971; Riche and Traverse 1970, 1971; Traverse 1972, 1973; Porter and Davis 1974; Pepper et al. 1975; Moores 1978). This report provides details on the migration of Atlantic salmon (Salmo salar) and other fish species through fishways and counting fences operated in Newfoundland and Labrador during 1977, 1978 and 1979. It also includes data summaries on fish migration through facilities operated in Newfoundland and Labrador since 1949 (Fig. 1). Some information on fishway and counting fence design have been provided but details on individual facilities are available in Porter and Davis (1974), and Moores (1978). Data from the recreational salmon fishery have also been included (Button and Wells 1974, 1975; Moores 1976; Moores et al. 1977; Moores et al. 1978, Moores and Tucker 1979; Moores and Tucker 1980).

METHODS

Fishways in Newfoundland and Labrador (Fig. 1) have been constructed for several reasons: to allow Atlantic salmon to reach previously inaccessible sections of rivers; to increase the rate of migration over partial stream obstructions, or, to provide a means of passage around dams. Four types of fishways are currently in use, including the square notch pool and weir, sloped notch pool and weir, vertical slot and submerged orifice (Fig. 2). The type of fishway is dependent on the height of the obstruction, the amount of water available to flow through the facility, and the water discharge characteristics of the river system.

The pool and weir type has been constructed more frequently in the past because it functions particularly well during low water discharge and was relatively cheap to construct. In recent years, the vertical slot type has been found to be more suitable because unlike the other designs, it is not necessary to regulate water flow at high discharge.

At present, there are 24 fishways operating in the province. Since 1949, Atlantic salmon migrations have been monitored periodically at fifteen facilities with six monitored in 1977 and twelve in both 1978 and 1979. Monitoring was generally undertaken by means of a wooden counting trap installed in the fishway. The size of the counting trap was determined by the fishway design but each has a v-shaped entrance. Fish were held in the traps, then counted, sized and released by means of a movable back door. Adults measuring less than 62 cm were considered to be one-sea-winter fish or grilse. Salmon equal to or greater than 62 cm were referred to as multi-sea-winter fish or salmon. Fish were measured against boards 62 cm in length which were placed on the bottom of the counting traps.

Fish counting fences or counting weirs have been designed and installed to monitor the migration of Atlantic salmon adults and juveniles in the freshwater environment. They have generally been of a temporary nature, constructed of

cotton or nylon netting, wire mesh, wood or metal conduit. Problems with fence maintenance, portability and fish mortality associated with the use of netting, wire and wood have led to an almost exclusive use of metal conduit fences. Anderson and MacDonald (1978) have described the construction and installation of this type of fence.

Since 1949, there have been 26 counting fences installed and operated in Newfoundland and Labrador. There were two fences installed in 1977 (one at Western Arm Brook and another on the Exploits River), and in 1978 and 1979, three were installed (one at Western Arm Brook and two on the Exploits River).

Throughout the report, mean water heights have been recorded. It should be noted that these values cannot be used as a measure of discharge. It is merely the height of water in the fishway or counting trap required to maintain optimum water flow for fish movement; water height is controlled by the use of stop logs.

MAP INDEX
(Fig. 1)

#	Location	Facility	Geographic coordinates	
1	Salmon River	Counting fence	51°06'21"N	56°09'15"W
2	Indian Brook	Fishway	49°30'44"N	56°06'45"W
3	Indian Brook	Counting fence	49°29'09"N	56°12'52"W
4	Riverhead Brook	Fishway	49°25'45"N	56°08'10"W
	Exploits River			
5	Bishops Falls	Fishway	49°00'45"N	55°28'20"W
6	Bishops Falls	Turbine by-pass	49°00'56"N	55°28'20"W
7	Great Rattling Brook	Fishway	48°55'33"N	55°31'18"W
8	Grand Falls	Fishway	48°55'55"N	55°40'20"W
9	Stoney Brook	Counting fence	55°40'30"N	55°40'30"W
10	Veneer Brook	Counting fence	48°32'00"N	56°36'08"W
11	Little Red Indian Brook	Counting fence	48°57'25"N	56°05'00"W
12	Noel Paul's Brook	Counting fence	48°55'35"N	55°31'36"W
13	Rattling Brook	Counting fence	49°04'28"N	49°18'30"W
14	Dog Bay River	Counting fence	49°25'55"N	54°35'28"W
15	Gander River	Counting fence	49°15'00"N	54°30'00"W
16	Salmon River	Fishway	49°00'02"N	54°53'42"W
17	Northwest Gander	Counting fence	48°49'00"N	55°03'00"W
18	Middle Brook	Fishway	48°48'31"N	54°13'16"W
19	Terra Nova River	Counting fence	48°40'00"N	54°01'00"W
20	Terra Nova River	Fishway	48°32'43"N	54°10'48"W
21	Terra Nova River	Fishway	48°36'08"N	54°04'43"W
22	Northwest River	Fishway	48°24'00"N	54°12'00"W
23	Northeast River (Placentia)	Fishway	47°17'08"N	53°47'37"W
24	Come by Chance River	Counting fence	47°51'17"N	53°58'30"W
25	Long Harbour River	Counting fence	47°48'03"N	54°56'11"W
26	Bay du Nord River	Fishway	47°50'00"N	55°27'00"W
27	Salmon River	Counting fence	47°49'11"N	56°00'02"W
28	White Bear River	Counting fence	48°01'47"N	57°18'20"W
29	Little Codroy River	Counting fence	47°47'00"N	59°16'00"W
30	Harrys Brook	Counting fence	48°33'10"N	58°24'25"W

MAP INDEX
(Fig. 1 Cont'd.)

#	Location	Facility	Geographic coordinates	
31	Humber River	Counting fence	49°33'37"N	57°05'30"W
32	Adies Stream	Counting fence	49°30'18"N	57°05'32"W
33	Lomond River	Fishway	49°23'17"N	57°43'09"W
34	Torrent River	Fishway	50°36'50"N	57°08'22"W
35	Main Ports Brook	Counting fence		
36	East River	Counting fence	50°38'30"N	57°10'00"W
37	Western Arm Brook	Counting fence	51°11'24"N	56°46'04"W
38	St. Charles River	Counting fence	52°14'00"N	55°52'00"W
39	Sand Hill River	Counting fence	53°33'00"N	56°20'45"W
40	Northwest Tributary	Counting fence		
41	West Brook	Counting fence	54°23'00"N	58°06'30"W
42	Middle Brook	Counting fence	54°23'00"N	58°05'00"W
43	Fraser River	Counting fence	56°39'00"N	63°11'00"W

(Fig. 1a)

#				
1	Northern Arm Brook	Fishway	49°09'00"N	55°23'00"W
2	Exploits River	Fishways	48°55'50"N	55°42'14"W
	Goodyear's Dam	Fishways		
3	Grand Bank Brook	Fishway	47°06'00"N	55°46'00"W
4	Conne River			
	Bernard's Brook	Fishway	48°00'54"N	55°36'36"W
5	Rose Blanche Brook	Fishway	47°37'00"N	58°42'11"W
6	Flat Bay Brook	Fishway	48°24'00"N	58°36'00"W
7	Humber River			
	Adies Stream	Fishway	49°31'00"N	57°06'00"W

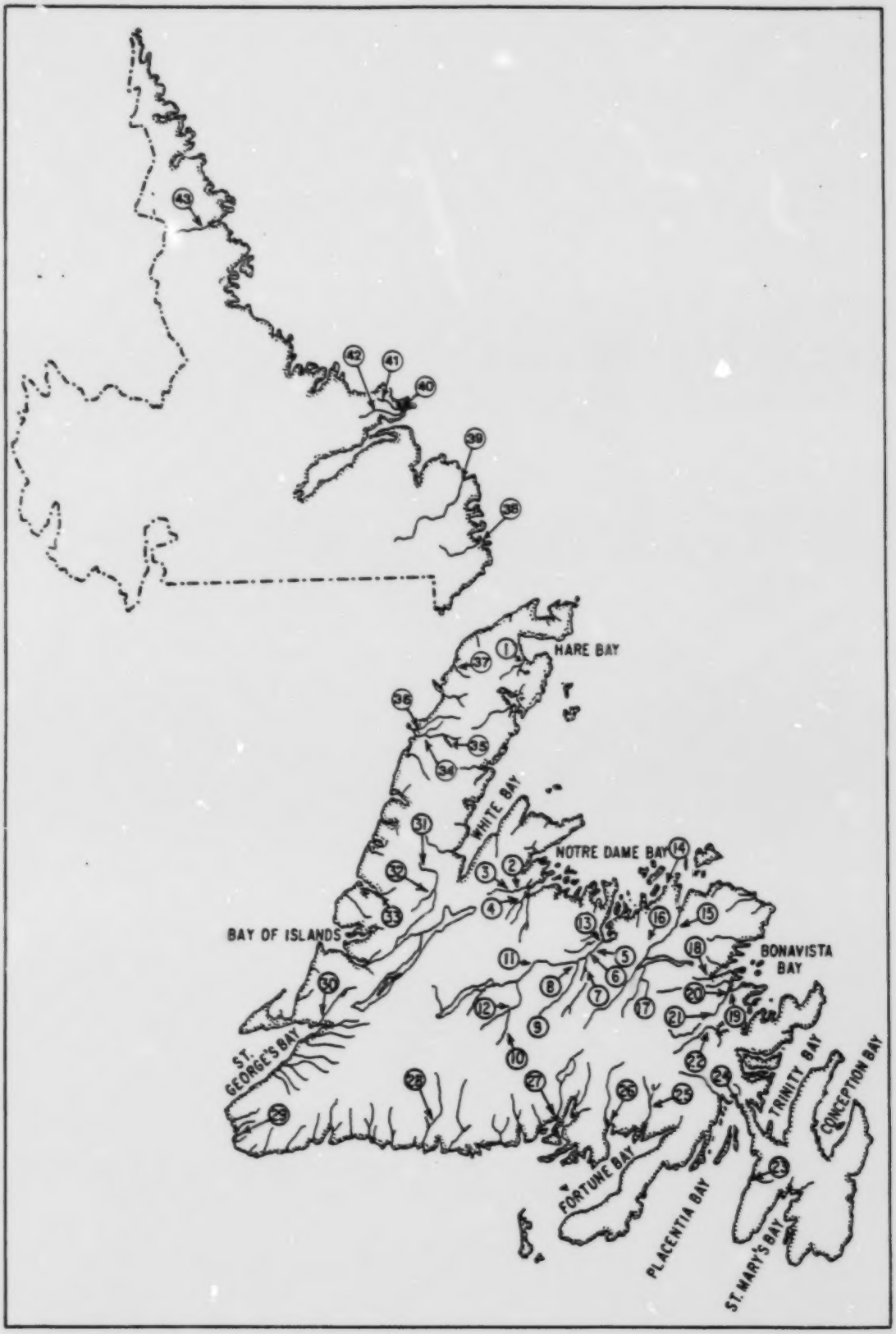
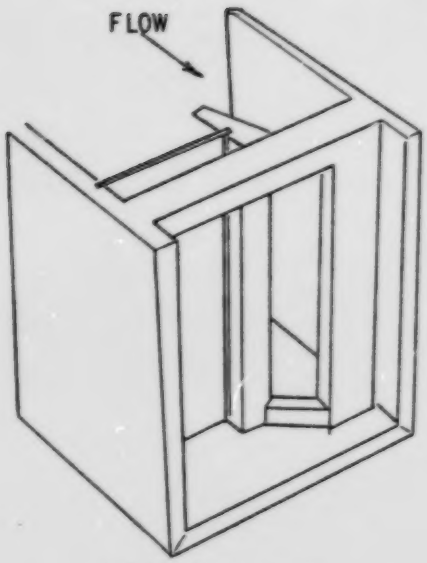
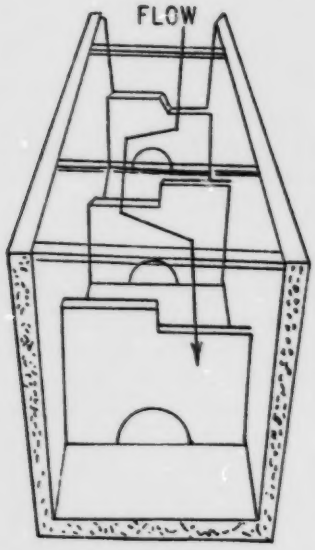


Fig. 1. Location map for fishways and counting fences in Newfoundland and Labrador at which fish migrations have been monitored, 1949-79.

Fig. 1a. Location of fishways in insular Newfoundland at which fish migrations have not been monitored (supplement to Fig. 1).



VERTICAL SLOT



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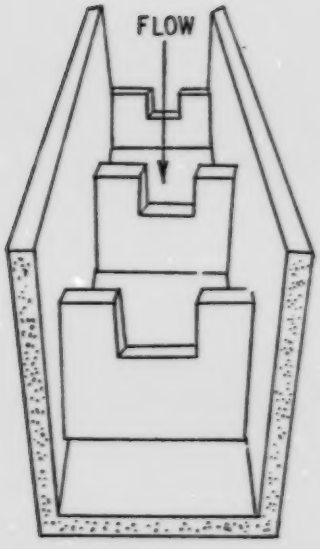
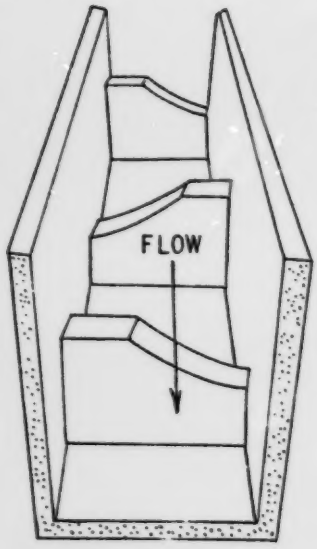


SQUARE NOTCH



SLOPED NOTCH

Fig. 2. Fishway designs used in Newfoundland and Labrador.

SALMON RIVER River code 0300850

Counting Fence

Salmon River is located on the northeastern side of the Great Northern Peninsula (Fig. 1). It flows east into Ariege Bay, Hare Bay over a distance of approximately 47 km. It drains an area of 252 km^2.

Fence operations on Salmon River were initiated to assess the effect of the West Greenland salmon fishery on Canada's Atlantic salmon stocks (Anon. 1969). Operations began in 1967 and terminated in 1970 (Anon. 1967, 1968; Riche and Traverse 1970, 1971). In 1967, two counting fences were installed, one at km 13 and another on Southwest Brook, a tributary at km 0.5. After 1967 only the former was installed.

The project included several aspects: to monitor Atlantic salmon upstream migration from 1967 to 1970; to enumerate downstream migrations of kelts and smolts in 1968 and 1970; and, to tag smolts, kelts and upstream migrating adult salmon in 1968. With the exception of the 1970 smolt count, all fish counts through the fence were considered to be complete (Table 1). However, only a partial estimate of total river escapement was available as salmon utilized the river below km 13 and some fish moved up Southwest Brook (60 grilse and three large salmon in 1967). The 1970 smolt count was not completed due to a fence washout. The count obtained is estimated to be 25% of the total smolt run.

Annual timing of adult salmon migrations and periods of fence operation are given in Table 2. Catch and effort data from the recreational fishery are presented in Table 3.

Table 1. Escapement of Atlantic salmon adults, smolts, and brook trout through the Salmon River counting fence, 1967-70.

Year	Adults			Juveniles	
	Grilse	Salmon	Kelt	Smolts	Brook trout
1967	605	28			42
1968	691	20	792	7,411	NR
1969	553	10			NR
1970	887	54		4,910*	NR

* partial count
NR not recorded

Table 2. Timing of adult Atlantic salmon migrations at the Salmon River counting fence, 1967-70.

Year	First adult recorded	Peak migration	Last adult recorded	Period of Operations
1967	08 July	19 Aug.- 26 Aug.	29 Aug.	07 July - 09 Sept.
1968	06 July	01 Sept.- 07 Sept.	21 Sept.	25 May - 03 Oct.
1969	29 June	27 July - 02 Aug.	25 Aug.	29 June - 25 Aug.
1970	22 June	30 Aug. - 05 Sept.	15 Sept.	22 June - 15 Sept.

Table 3. Angled catch, effort and catch per unit effort of Atlantic salmon, Salmon River, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	50	28	0	28	0.56	100
1954	66	7	0	7	0.11	100
1955	36	11	0	11	0.31	100
1956	113	48	0	48	0.42	100
1957	33	22	0	22	0.67	100
Mean 1953-57	59.6	23.2	0.0	23.2	0.39	100
1958	34	15	0	15	0.44	100
1959	27	3	0	3	0.11	100
1960	6	2	0	2	0.33	100
1961	21	4	1	5	0.24	80
1962	33	7	0	7	0.21	100
Mean 1958-62	24.2	6.2	0.2	6.4	0.26	97
1963	56	51	0	51	0.91	100
1964	54	27	0	27	0.50	100
1965	46	55	0	55	1.20	100
1966	50	85	0	85	1.70	100
1967	241	130	0	130	0.54	100
Mean 1963-67	89.4	69.6	0.0	69.6	0.78	100
1968	62	132	0	132	2.13	100
1969	37	118	0	118	3.19	100
1970	43	129	0	129	3.00	100
1971	143	172	1	173	1.21	199
1972	222	135	0	135	0.61	100
Mean 1968-72	101.4	137.2	0.21	37.4	1.36	100
1973	418	398	2	400	0.96	99
1974	379	156	4	160	0.42	97
1975	276	164	0	164	0.59	100
1976	383	141	1	142	0.37	99
1977	348	256	4	260	0.75	98
Mean 1973-77	360.8	223.0	2.2	225.2	0.62	99
1978	323	177	1	178	0.55	99
1979	378	375	0	375	0.99	100

INDIAN BROOK River code 0605570

Fishway

Background information on Indian Brook fishway (Fig. 1) is presented in Anon. (1958-1965), Pratt and Sturge (1965), Peet (1966), Anon. (1967-1969), Riche and Traverse (1970, 1971), Traverse (1972, 1973), Porter and Davis (1974), Pepper et al. (1975), and Moores (1978).

Enumeration of Atlantic salmon utilizing the Indian River fishway began in 1958, and with the exception of 1962, has been continued to the present (Table 4). The fishway has been operated without any major problems although for security reasons metal grating was installed over the fishway in 1978-79. A new counting trap was installed in 1979 as a part of regular maintenance of these facilities.

In 1977 and 1978, migration of Atlantic salmon through Indian River fishway was at or near record levels (Table 4). Although restrictions on the use of herring and mackerel nets are thought to have contributed to an increase in river escapement, extremely low water levels in both years made movement upstream via the Indian Falls virtually impossible. Unlike previous years, the majority of salmon are believed to have utilized the fishway.

In 1979, the number of salmon enumerated increased by approximately six times the 1972-76 mean escapement (Table 4). Although fish released by restrictions on the commercial fishery may have again contributed to the increased escapement, it could also be the result of a successful enhancement program. In 1975, juvenile salmon from Indian River spawning channel (reactivated in 1974) were stocked in Black Brook, a tributary of Indian River inaccessible to salmon because of a 10 m falls near its confluence with the main stem (Davis and Farwell 1975). These fish returned as grilse in 1979. Timing of the annual migration in 1979 remained relatively unchanged from previous years (Table 6).

Data obtained at a counting fence (1967-73) operated in conjunction with the Indian River spawning channel are given in Table 7.

Despite river closures due to low water levels and high water temperatures, the recreational salmon fishery on Indian River from 1977 to 1979 was very successful. Angling effort showed some increase over the three year period with catches in 1977 and 1979 among the highest recorded (Table 8). Although low water levels may have made salmon more susceptible to angling, the increase in river escapement undoubtedly contributed to the higher catches.

Table 4. Escapement of fish through the Indian Brook fishway, 1958-79.

Year	Atlantic salmon			% Grilse	Brook Trout**	
	Grilse	Salmon	Total		Sea Run	Resident
1958**	843	80	923	91	52	
1959**	438	18	456	96	22	
1960**	494	25	519	95	6	
1961**	153	1	154	99	-	
1962*	-	-	-	-	-	
1963**	267	22	289	92	-	
1964**	1199	45	1244	96	9	
1965	394	0	394	100	-	
1966**	292	3	295	99	9	
1967	116	0	116	100	-	
1968	682	0	682	100	12	
1969	222	3	225	99	-	
1970	392	0	392	100	-	
1971	364	0	364	100	-	
1972	112	0	112	100	-	
1973	714	3	717	99	27	
1974	616	8	624	99	25	
1975	788	11	799	99	39	
1976	353	3	356	99	23	1
1977	1307	23	1330	98	[illegible]	0
1978	1125	13	1138	99	143	113
1979	2959	113	3072	96	50	17
Mean 1958-61	482	31	513	94		
Mean 1963-66	538	18	556	97		
Mean 1967-71	365	1	366	100		
Mean 1972-76	517	5	522	99		

* no data obtained (trap not in operation)
** partial counts

NOTE: Angling occurred above and below fishway.

Table 5. Weekly escapement of Atlantic salmon and other fishes through the Indian Brook fishway, 1977-79. Mean water temperatures and water levels included.

Week (ending)	1977 Escapement						Mean Water Temp. (°C)	Mean Water* Height (cm)
	Atlantic salmon			Brook Trout**				
	Grilse	Salmon	Total	Sea run	Resident	Eels		
02-07-77	43	0	43	3	-	-	-	-
09-07-77	295	8	303	15	-	-	-	-
16-07-77	175	0	175	-	-	-	-	-
23-07-77	360	1	361	4	-	-	-	-
30-07-77	240	5	245	19	-	-	16.0	-
06-08-77	123	8	131	9	-	-	16.0	-
13-08-77	15	0	15	24	-	-	16.0	-
20-08-77	28	0	28	32	-	-	14.0	-
27-08-77	17	1	18	17	-	-	13.0	-
03-09-77	7	0	7	25	-	-	14.0	-
10-09-77	2	0	2	4	-	-	-	-
17-09-77	2	0	2	1	-	-	-	-
24-09-77	0	0	0	0	-	-	-	-
01-10-77	0	0	0	0	-	-	-	-
08-10-77	0	0	0	0	-	-	-	-
Total	1307	23	1330	153	0	0		

* no record
** partial count

Table 5. Cont'd.

1978 Escapement

Week (ending)	Atlantic salmon Grilse	Salmon	Total	Brook Trout** Sea run	Resident	Eels	Mean Water Temp. (°C)	Mean Water Height (cm)
24-06-78	0	0	0	4	4	0	-	-
01-07-78	22	3	25	4	10	0	10.0	40.7
08-07-78	137	3	140	2	6	0	12.6	46.2
15-07-78	295	1	296	97	26	0	17.1	27.9
22-07-78	350	0	350	18	65	0	16.7	26.4
29-07-78	225	5	230	0	0	0	15.2	22.8
05-08-78	92	1	93	2	0	0	17.7	9.9
12-08-78	0	0	0	0	0	0	16.4	9.2
19-08-78	1	0	1	0	2	0	15.8	30.6
26-08-78	2	0	2	0	0	0	12.8	18.1
02-09-78	1	0	1	16	0	0	8.3	28.5
Total	1125	13	1138	143	113	0		

Table 5. (Cont'd.)

1979 Escapement

Week (ending)	Atlantic salmon Grilse	Salmon	Total	Brook Trout** Sea run	Resident	Eels	Mean Water Temp. (°C)	Mean Water Height (cm)
30-06-79	32	3	35	0	2	0	14.1	51.3
07-07-79	139	11	150	0	2	0	15.8	52.4
14-07-79	607	25	632	1	2	0	17.1	56.1
21-07-79	910	35	945	2	2	0	16.0	63.0
28-07-79	492	18	510	8	2	0	18.6	63.7
04-08-79	356	6	362	22	1	0	18.3	68.1
11-08-79	172	14	186	8	3	0	16.4	71.9
18-08-79	127	1	128	8	1	0	13.6	72.3
25-08-79	80	0	80	1	0	0	14.4	75.3
01-09-79	30	0	30	0	2	0	15.2	65.1
08-09-79	14	0	14	0	0	0	13.6	56.8
Total	2959	113	3072	50	17	0		

**Partial counts

Table 6. Timing of the Atlantic salmon migrations at the Indian Brook fishway, 1958-79.

Year	First adult recorded	Peak migration	Last Adult recorded	Period of Operation
1958	24 June	27 July - 02 Aug	20 Sept	25 May - 11 Oct
1959	09 July	19 July - 25 July	03 Sept	09 July - 03 Sept
1960+	29 June	17 July - 23 July	23 Sept	26 June - 08 Oct
1961	30 June	23 July - 29 July	08 Sept	28 June - 09 Sept
1962**	-	-	-	-
1963	24 June	14 July - 20 July	19 Aug	23 June - 15 Sept
1964	29 June	26 July - 01 Aug	05 Sept	29 June - 12 Sept
1965	28 June	18 July - 24 July	03 Sept	27 June - 04 Sept
1966	04 July	17 July - 23 July	29 Aug	03 July - 03 Sept
1967*	02 Aug	06 Aug - 12 Aug	23 Aug	30 July - 26 Aug
1968	09 July	04 Aug - 10 Aug	08 Oct	09 July - 19 Oct
1969	01 July	20 July - 26 July	29 Aug	29 June - 01 Nov
1970	26 June	19 July - 25 July	25 Sept	21 June - 26 Sept
1971	28 June	25 July - 31 July	16 Oct	20 June - 23 Oct
1972	09 July	23 July - 29 July	08 Sept	02 July - 09 Sept
1973	29 June	08 July - 14 July	28 Oct	17 June - 28 Oct
1974	07 July	28 July - 03 Aug	11 Oct	01 July - 18 Oct
1975	30 June	17 Aug - 23 Aug	23 Sept	29 July - 27 Oct
1976	02 July	25 July - 31 July	08 Oct	27 June - 09 Oct
1977	30 June	17 July - 23 July	15 Sept	20 June - 05 Oct
1979	25 June	16 July - 22 July	29 Aug	21 June - 01 Sept
1979	25 June	15 July - 21 July	06 Sept	25 June - 07 Sept

+ Due to low water levels, trap inoperative from 23 Aug - 17 Sept
* Trap not operating properly
**Trap not in operation

Table 7. Escapement of Atlantic salmon and other fishes through the Indian Brook counting fence, 1967-73.

Year	Atlantic salmon						Brook Trout	Eels	Smelt	Arctic Charr
	Grilse	Salmon	Total	Smolt	Parr	Kelt				
1967	300	3	303	4654	777	41	618	170	12	1
1968	682	11	693	13128	912	5	762	70	2	0
1969	188	9	197	12263	584	1	1043	81	26	5
1970	205	1	206	11604	780	24	1224	226	-	2
1971	453	0	453	9622	1499	27	2128	205	9	1
1972	109	0	109	13481	997	207	1132	205	6	1
1973	703	12	715	9219	1282	-	21	-	-	-

Table 8. Angled catch, effort and catch per unit effort of Atlantic salmon, Indian Brook, 1952-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1952	358	232	12	244	0.68	95
1953	640	178	4	182	0.28	98
1955	499	219	2	221	0.44	99
1956	513	312	1	313	0.61	100
Mean 1952-53, 1955-56	503	235	5	240	0.48	98
1957	515	350	0	350	0.68	100
1958	601	422	7	429	0.71	98
1959	516	281	0	281	0.54	100
1960	565	172	8	180	0.32	96
1961	478	176	1	177	0.37	99
Mean 1957-61	535	280	3	283	0.53	99
1962	617	361	5	366	0.59	99
1963	601	218	6	224	0.37	97
1964	646	566	9	575	0.89	98
1965	729	254	4	258	0.35	98
1966	616	253	4	257	0.42	98
Mean 1962-66	642	330	6	336	0.52	98
1967	520	125	2	127	0.24	98
1968	622	350	1	351	0.56	99
1969	534	154	1	155	0.29	99
1970	482	191	0	191	0.40	100
1971	555	266	1	267	0.48	99
Mean 1967-71	543	217	1	218	0.40	99
1972	390	102	0	102	0.26	100
1973	720	372	2	374	0.52	99
1974	570	147	0	147	0.26	100
1975	396	101	0	101	0.26	100
1976	584	143	0	143	0.24	100
Mean 1972-76	532	173	1	174	0.33	99
1977	1199	503	0	503	0.42	100
1978	719	278	0	278	0.39	100
1979	973	436	1	437	0.45	100

RIVERHEAD BROOK River code 0605640

Fishways

Riverhead Brook flows northeast into Halls Bay, Notre Dame Bay on insular Newfoundland's northeast coast (Fig. 1). It drains an area of 464 km^2 and flows for a distance of approximately 40 km. The watershed was logged in the late 1940's to the mid 1950's. During the logging period a dam was constructed at km 0.8 and, despite the inclusion of two wooden fishways, it delayed the annual migration of Atlantic salmon. In 1956, counting traps were installed in the fishways to determine the extent of the problem (Anon. 1957). A total of 1264 grilse and 74 large salmon were recorded. With the exception of a few fish which may have moved upstream prior to trap installation, these counts, plus the 468 grilse and four large salmon taken by anglers, are thought to represent the entire 1956 escapement of Atlantic salmon to Riverhead Brook. Examination of the angling data since 1953 suggest little change in river escapement to the system since that time (Table 9).

Table 9. Angled catch, effort and catch per unit effort of Atlantic salmon, Riverhead Brook, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	624	140	0	140	0.22	100
1954	490	179	7	186	0.38	96
1955	519	231	1	232	0.45	100
1956	769	468	4	472	0.61	99
1957	1187	233	2	235	0.20	99
Mean 1953-57	717.8	250.2	2.8	253.0	0.35	99
1958	193	386	0	386	2.00	100
1959	743	166	0	166	0.22	100
1960	250	88	1	89	0.36	99
1961	187	35	0	35	0.19	100
1962	309	218	0	218	0.71	100
Mean 1958-62	336.4	178.6	0.2	178.8	0.53	100
1963	340	265	0	265	0.78	100
1964	403	303	0	303	0.75	100
1965	568	329	0	329	0.58	100
1966	826	518	2	520	0.63	100
1967	541	160	1	161	0.30	99
Mean 1963-67	535.6	315.0	0.6	315.6	0.59	100
1968	779	567	0	567	0.73	100
1969	707	307	1	308	0.44	100
1170	1121	600	0	600	0.54	100
1971	877	416	0	416	0.47	100
1972	429	189	0	189	0.44	100
Mean 1968-72	782.6	415.8	0.2	416.0	0.53	100
1973	795	554	0	554	0.70	100
1974	816	166	0	166	0.20	100
1975	626	195	0	195	0.31	100
1976	1015	298	0	298	0.29	100
1977	927	360	7	367	0.40	98
Mean 1973-77	835.8	314.6	1.4	316.0	0.38	100
1978	703	256	0	256	0.36	100
1979	731	382	0	382	0.62	100

EXPLOITS RIVER River code 0707790

Fishways

Background information on the enhancement and management of Atlantic salmon the Exploits River (Fig. 1) is available in Mercer (1974), Farwell (1975), Davis and Farwell (1975), Farwell and Porter (1976), Moores (1978). Details of daily operation of fish passage facilities on the Exploits River prior to 1977 are presented in Anon. (1957-65), Peet (1966), Anon. (1967-1969), Riche and Traverse (1970, 1971), Traverse (1972, 1973) Farwell (1972), Porter and Davis (1974), Mercer and Anderson (1974), Pepper et al. (1975).

Bishop's Falls Fishway

Enumeration of Atlantic salmon at Bishop's Falls Fishway has been undertaken intermittently since 1959 (Table 10). The angling catch (Table 11) plus fish counted at Bishop's Falls are believed to represent the entire annual migration to the Exploits River. Weekly counts of salmon are given for the years 1977-79 (Table 12). Migration periods are given in Table 13.

Table 10. Escapement of Atlantic salmon and other fishes++ through the Bishop's Falls fishway, 1959-79.

Year	Atlantic Salmon			% Grilse	Brook Trout*		Ouananiche*	Smelt*	Eels*
	Grilse	Salmon	Total		Resident	Sea run			
1959*	886	119	1005	88	-	-	-	-	-
1960	1013	157	1170	87	-	-	-	-	-
1961	839	118	957	88	-	-	-	-	-
1962+	-	-	-	-	-	-	-	-	-
1963	1202	65	1267	95	-	-	-	-	-
1964+	-	-	-	-	-	-	-	-	-
1965	1228	203	1431	86	-	-	-	-	-
1966*	829	506	1335	62	-	-	-	-	-
1967	1372	710	2082	66	-	46	-	-	-
1968+	-	-	-	-	-	-	-	-	-
1969	979	498	1477	66	-	-	-	-	-
1970+	-	-	-	-	-	-	-	-	-
1971	961	300	1261	76	0	11	0	0	0
1972	794	113	907	88	5	13	0	0	0
1973+	205	89	294	70	0	2	0	0	0
1974	2583	411	2994	86	0	19	1	0	0
1975	9010	1441	10451	86	0	122	0	0	1
1976	4106	493	4599	89	4	45	2	0	1
1977	6058	584	6642	91	3	31	10	1	1
1978	3757	302	4059	93	22	9	0	0	1
1979	6693	276	6969	96	10	77	0	0	1

* Partial counts + No count obtained
++ Other species not usually counted until 1971.
NOTE: Angling occurred above and below fishway.

Table 11. Angled catch, effort and catch per unit effort of Atlantic salmon, Exploits River, 1954-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1954	424	77	2	79	0.19	97
1955	859	382	3	385	0.45	99
1956	1040	474	8	482	0.46	98
1957	1457	657	11	668	0.46	98
1958	420	477	81	558	1.33	85
Mean 1954-58	840	413	21	434	0.52	95
1959	717	258	59	317	0.44	81
1960	1558	417	43	460	0.31	91
1961	1050	245	14	259	0.25	95
1962	1797	732	53	785	0.44	93
1963	1712	452	55	507	0.30	89
Mean 1959-63	1367	427	45	472	0.34	90
1964	4459	1135	182	1317	0.30	86
1965	2636	392	27	419	0.16	94
1966	3183	693	32	725	0.23	96
1967	1960	368	13	381	0.19	97
1968	3332	848	51	899	0.27	94
Mean 1964-68	3115	688	61	749	0.24	92
1969	735	414	101	515	0.70	80
1970	1595	429	35	464	0.29	92
1971	1081	515	9	524	0.48	98
1972	1419	463	0	463	0.33	100
1973	2352	423	1	424	0.18	99
Mean 1969-73	1436	449	29	478	0.33	94
1974	4544	1077	57	1134	0.25	95
1975	5702	1565	54	1619	0.28	97
1976	5775	1880	54	1934	0.33	97
1977	6944	1769	83	1852	0.27	96
1978	5031	1426	54	1480	0.29	96
Mean 1974-78	5599	1543	60	1603	0.28	96
1979	8363	1431	0	1431	0.17	100

Table 12. Weekly escapement of Atlantic salmon and other fishes* through the Bishop's Falls fishway, 1977-79.

Week (ending)	1977 Escapement								Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout						
	Grilse	Salmon	Total	Sea Run	Resident	Eels	Ouananiche	Smelt		
25-06-77	1	0	1	0	0	0	0	0	26.3	-
02-07-77	104	34	138	0	3	0	10	0	16.2	107.4
09-07-77	519	34	553	0	0	0	0	0	16.6	110.1
16-07-77	1835	202	2037	5	0	0	0	1	17.7	131.6
23-07-77	2176	156	2332	8	0	0	0	0	19.4	109.7
30-07-77	733	87	820	7	0	1	0	0	16.6	120.4
06-08-77	394	38	432	3	0	0	0	0	19.0	122.6
13-08-77	153	21	174	5	0	0	0	0	19.8	106.7
20-08-77	63	3	66	1	0	0	0	0	17.5	108.4
27-08-77	8	0	8	2	0	0	0	0	17.9	109.7
03-09-77	28	2	30	0	0	0	0	0	18.1	106.7
10-09-77	23	3	26	0	0	0	0	0	16.0	107.6
17-09-77	15	3	18	0	0	0	0	0	14.4	102.9
24-09-77	6	1	7	0	0	0	0	0	12.3	96.0
Total	6058	584	6642	31	3	1	10	1		

*Partial counts only

Table 12. Cont'd.

Week (ending)	1978 Escapement								Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout						
	Grilse	Salmon	Total	Sea Run	Resident	Eels	Ouananiche	Smelt		
01-07-78	14	2	16	-	-	-	-	-	19.3	-
08-07-78	347	58	405	-	-	-	-	-	15.6	-
15-07-78	1587	162	1749	0	10	0	0	0	20.3	113.6
22-07-78	1146	50	1196	1	6	1	0	0	20.6	113.6
29-07-78	329	20	349	6	1	0	0	0	19.2	114.4
05-08-78	162	4	166	-	-	-	-	-	23.0	-
12-08-78	70	3	73	-	-	-	-	-	20.0	-
19-08-78	35	0	35	0	2	0	0	0	18.6	108.0
26-08-78	20	1	21	0	3	0	0	0	17.9	84.0
02-09-78	29	1	30	2	0	0	0	0	16.4	90.9
09-09-78	8	0	8	0	0	0	0	0	11.7	94.3
16-09-78	2	0	2	0	0	0	0	0	9.0	84.4
23-09-78	6	1	7	0	0	0	0	0	9.9	87.0
30-09-78	2	0	2	0	0	0	0	0	12.2	74.1
Total	3757	302	4059	9	22	1	0	0		

Table 12. Cont'd.

Week (ending)	1979 Escapement								Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout						
	Grilse	Salmon	Total	Sea Run	Resident	Eels	Ouananiche	Smelt		
09-06-79	0	0	0	0	0	0	0	0	15.8	117.6
16-06-79	0	0	0	0	0	0	0	0	15.3	119.6
23-06-79	3	1	4	0	0	1	0	0	15.0	114.4
30-06-79	140	23	163	14	0	0	0	0	16.7	112.3
07-07-79	385	27	412	6	2	0	0	0	16.2	120.0
14-07-79	1033	104	1137	7	7	0	0	0	15.3	116.8
21-07-79	1277	24	1301	6	0	0	0	0	17.7	118.7
28-07-79	1539	39	1578	7	0	0	0	0	19.2	118.3
04-08-79	1307	26	1333	18	1	0	0	0	21.8	121.3
11-08-79	398	13	411	7	0	0	0	0	20.9	109.3
18-08-79	301	14	315	4	0	0	0	0	17.6	115.7
26-08-79	200	4	204	5	0	0	0	0	17.3	119.6
01-09-79	60	1	61	2	0	0	0	0	18.0	116.4
08-09-79	50	0	50	1	0	0	0	0	16.7	117.0
15-09-79	0	0	0	0	0	0	0	0	16.8	112.5
Total	6693	276	6969	77	10	1	0	0		

Table 13. Timing of Atlantic salmon migrations through Bishop's Falls fishway, 1959-79.

Year	First adult recorded	Peak migration	Last adult recorded	Period of Operation
1959	03 July	19 July-25 July	13 Oct	01 July-14 Nov
1960	27 June	17 July-23 July	10 Oct	06 June-10 Nov
1961	03 July	06 Aug-12 Aug	01 Sept	01 July-02 Sept
1962+	-	-	-	-
1963	04 July	28 July-03 Aug	19 Aug	01 July-06 Sept
1964+	-	-	-	-
1965	30 June	25 July-31 July	28 Aug	30 June-28 Aug
1966	28 June	17 July-23 July	03 Sept	28 June-23 Sept
1967	01 July	16 July-22 July	16 Sept	26 June-16 Sept
1968+	-	-	-	-
1969	18 June	27 July-02 Aug	27 Aug	18 June-30 Aug
1970+	-	-	-	-
1971	28 June	18 July-24 July	18 Aug	28 June-21 Aug
1972	13 July	23 July-29 July	04 Oct	13 July-07 Oct
1973	29 June	08 July-14 July	27 Aug	29 June-13 Sept
1974	15 July	29 July-04 Aug	14 Sept	23 June-16 Sept
1975	22 June	13 July-19 July	09 Sept	15 June-10 Sept
1976	10 June	24 July-31 July	04 Oct	09 June-08 Oct
1977	25 June	17 July-23 July	20 Sept	24 June-23 Sept
1978	27 June	10 July-16 July	26 Sept	25 June-07 Oct
1979	23 June	22 July-28 July	12 Sept	05 June-12 Sept

+ No count obtained

EXPLOITS RIVER (Cont'd) River code 0707790

Bishop's Falls Turbine By-pass Facility

The smolts and kelts enumerated through Bishop's Falls turbine by-pass facility represent only part of the annual downstream migration for the Exploits River (Table 14). Additional migrants are known to move directly over the hydroelectric dam and through the turbines. Weekly migration records for 1977-79 are given in Table 15.

Table 14. Counts of Atlantic salmon (smolts and kelts) and other fishes obtained at the Bishop's Falls turbine by-pass facility, 1972-79*.

Year	Atlantic Salmon			Brook Trout+		Ouananiche+	Eels+
	Smolt*	Kelt*	Parr	Sea Run	Resident		
1972	9553	184	-	-	-	-	-
1973	15125	219	-	-	-	-	-
1974	22141	746	-	-	-	-	-
1975	17326	601	-	223	-	6	8
1976	16420	685	3	65	5	0	-
1977	14369	637	-	0	2	1	0
1978	8963	801	-	27	0	8	0
1979	86791	1117	-	176	0	5	2

* Partial counts
\+ Incomplete counts

Table 15. Weekly escapement of Atlantic salmon (smolts and kelts) and other fishes* at the Bishop's Falls turbine by-pass facility, 1977-79.

Week (ending)	1977 Escapement							Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout		Ouananiche	Eels		
	Smolt	Kelt	Parr	Sea Run	Resident				
30-04-77	8	30	-	-	-	-	-	2.2	145.1
07-05-77	7	22	-	-	-	-	-	3.3	104.9
14-05-77	9	103	-	-	-	-	-	3.9	76.6
21-05-77	24	171	-	-	-	-	-	5.0	107.7
28-05-77	334	167	-	-	-	-	-	7.3	100.6
04-06-77	3254	111	-	-	-	-	-	10.5	92.3
11-06-77	2604	11	-	2	-	1	-	13.0	45.0
18-06-77	1343	1	-	-	-	-	-	13.8	25.1
25-06-77	5609	16	-	-	-	-	-	12.8	59.0
02-07-77	768	2	-	-	-	-	-	16.8	92.7
09-07-77	379	2	-	-	-	-	-	16.9	91.9
16-07-77	23	1	-	-	-	-	-	17.1	120.6
23-07-77	7	0	-	-	-	-	-	17.9	87.4
Total	14369	637	0	2	0	1	0		

*Partial counts

Table 15. Cont'd.

Week (ending)	1978 Escapement							Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout		Ouananiche	Eels		
	Smolt	Kelt	Parr	Sea Run	Resident				
06-05-78	0	15	-	-	-	-	-	2.3	39.0
13-05-78	0	158	-	-	-	-	-	5.8	34.5
20-05-78	102	236	-	-	-	-	-	10.0	29.4
27-05-78	140	29	-	-	-	-	-	8.6	9.6
03-06-78	491	156	-	-	1	-	-	8.5	11.1
10-06-78	748	53	-	-	-	-	-	12.0	12.9
17-06-78	1846	103	-	-	4	-	-	15.4	15.0
24-06-78	3375	16	-	-	19	6	-	17.5	29.8
01-07-78	1333	16	-	-	2	-	-	18.0	27.2
08-07-78	447	14	-	-	1	-	-	16.8	33.0
15-07-78	336	5	-	-	-	2	-	21.7	34.9
17-09-78	145	0	-	-	-	-	-	-	-
Total	8963	801	0	0	27	8	0		

Table 15. Cont'd.

Week (ending)	1979 Escapement							Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout		Ouananiche	Eels		
	Smolt	Kelt	Parr	Sea Run	Resident				
29-04-79	0	57	0	0	0	0	0	5.0	16.2
06-05-79	11	57	0	0	9	0	0	7.0	14.0
13-05-79	3	108	0	0	0	0	0	6.7	23.1
20-05-79	72	159	0	0	5	0	0	12.0	15.9
27-05-79	26874	691	0	0	21	0	0	14.7	13.3
03-06-79	21568	30	0	0	56	2	0	14.5	27.2
10-06-79	28867	11	0	0	40	1	0	15.5	34.3
17-06-79	6052	2	0	0	9	1	0	15.8	35.1
24-06-79	2787	2	0	0	9	0	0	16.4	33.9
01-07-79	545	0	0	0	18	0	0	16.3	33.4
08-07-79	5	0	0	0	9	1	2	17.1	36.0
15-07-79	7	0	0	0	0	0	0	16.7	36.0
Total	86791	1117	0	0	176	5	2		

EXPLOITS RIVER (Cont'd) River code 0707790

Great Rattling Brook (Camp I)

With the exception of 1973-74, enumeration of Atlantic salmon has been undertaken at Great Rattling Brook (Camp I) since 1960 (Table 16). Migrants recorded at Camp I have previously been released from the Bishop's Falls fishway and angling data from this tributary (Table 17) are included in total angling data for the Exploits River (Table 11). Weekly counts of Atlantic salmon for the years 1977-79 are given in Table 18. Migration periods are given in Table 19.

Table 16. Escapement of Atlantic salmon and other fishes* through the Great Rattling Brook fishway, 1960-79, including fish transferred to Noel Paul's Brook, 1975-79.

Year	Atlantic Salmon					Brook Trout		Eels
	Grilse	Salmon	Total	% Grilse	Transferred++	Sea Run	Resident	
1960	94	9	103	91		-	-	-
1961	319	53	372	86		-	-	-
1962	1037	31	1068	97		4	0	0
1963+	491	37	528	93		-	-	-
1964	1752	116	1868	94		1	0	0
1965	587	190	777	76		-	-	-
1966	942	470	1412	67		-	-	-
1967	822	382	1204	68		-	-	-
1968	1334	687	2021	66		-	-	-
1969	892	290	1182	75		2	0	0
1970	1023	199	1222	84		1	1	0
1971	902	261	1163	78		1	0	0
1972	495	234	729	68		3	0	0
1973**	-	-	-	-		-	-	-
1974**	-	-	-	-		-	-	-
1975	6012	544	6556	92	795	3	1	0
1976	3037	121	3158	96	995	27	1	1
1977	4295	258	4553	94	932	27	1	1
1978	2675	78	2753	97	579	4	1	6
1979	3930	127	4057	97	888	28	2	17

+ Of the (528) escapement, 25-30 were killed at site due to malfunction in the fishway

++Transferred to Noel Paul's Brook incubation facility and brood source

* Incomplete counts

**No count obtained

NOTE: Prior to 1979, angling occurred above and below the fishway.

Table 17. Angled catch, effort and catch per unit effort of Atlantic salmon, in Great Rattling Brook, 1962-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1962	356	83	3	86	0.24	97
1963	204	34	3	37	0.18	92
1964	501	171	0	171	0.34	100
1965	289	46	0	46	0.16	100
1966	681	136	0	136	0.20	100
Mean 1962-66	406	94	1	95	0.23	98
1967	385	49	0	49	0.13	100
1968	900	229	21	250	0.28	92
1969	47	17	6	23	0.49	74
1970	284	87	4	91	0.32	96
1971	80	31	1	32	0.40	97
Mean 1967-71	339	83	6	89	0.26	92
1972	338	64	0	64	0.19	100
1973	497	109	0	109	0.22	100
1974*	0	0	0	0	-	-
1975	527	47	0	47	0.09	100
1976	1194	222	0	222	0.19	100
Mean 1972-73, 1975-76	652	111	0	111	0.17	100
1977	2104	394	23	417	0.20	94
1978	483	223	18	241	0.50	93
1979*	0	0	0	0	-	-

*The recreational fishery was closed.

Table 18. Weekly escapement of Atlantic salmon and other fishes through the Great Rattling Brook fishway, 1977-79.

Week (ending)	1977 Escapement						Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout				
	Grilse	Salmon	Total	Sea Run	Resident	Eels		
09-07-77	12	7	19	0	0	0	-	-
16-07-77	167	18	185	0	0	0	18.0	69.0
23-07-77	1233	65	1298	0	0	0	16.9	71.6
30-07-77	748	32	780	0	1	0	15.7	78.0
06-08-77	839	36	875	3	0	0	19.7	64.3
13-08-77	515	33	548	1	0	0	17.4	57.4
20-08-77	527	41	568	1	0	0	15.7	55.7
27-08-77	117	10	127	1	0	0	14.9	57.9
03-09-77	17	1	18	0	0	0	17.4	55.3
10-09-77	37	0	37	0	0	0	13.5	71.6
17-09-77	68	13	81	0	0	0	11.3	76.7
24-09-77	15	2	17	0	0	0	9.8	74.0
Total	4295	258	4553	6	1	0		

Table 18. Cont'd.

Week (ending)	1978 Escapement						Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout				
	Grilse	Salmon	Total	Sea Run	Resident	Eels		
15-07-78	206	7	213				20.0	119.3
22-07-78	1152	46	1198				21.5	116.6
29-07-78	646	11	657				19.5	107.0
05-08-78	137	9	146				22.0	79.5
12-08-78	323	2	325				19.3	77.1
19-08-78	112	0	112	1	0	0	17.3	77.6
26-08-78	48	1	49	0	0	0	16.6	93.0
02-09-78	12	0	12	0	1	0	20.0	102.0
09-09-78	7	0	7	0	0	1	10.6	102.5
16-09-78	15	2	17	0	0	0	9.3	105.7
23-09-78	11	0	11	1	0	5	10.0	108.0
30-09-78	6	0	6	2	0	0	12.3	104.2
Total	2675	78	2753	4	1	6		

Table 18 Cont'd.

Week (ending)	1979 Escapement						Mean Water Temp (°C)	Mean* Water Height (cm)
	Atlantic Salmon			Brook Trout				
	Grilse	Salmon	Total	Sea Run	Resident	Eels		
07-07-79	37	2	39	7	0	0	-	-
14-07-79	180	11	191	-	-	-	-	-
21-07-79	471	8	479	4	0	1	16.9	-
28-07-79	1033	25	1058	0	2	0	21.2	-
04-08-79	981	29	1010	1	0	0	19.0	-
11-08-79	467	26	493	0	0	0	16.7	-
18-08-79	381	20	401	11	0	12	-	-
25-08-79	186	2	188	1	0	0	14.5	-
01-09-79	121	2	123	2	0	3	-	-
08-09-79	37	0	37	2	0	0	17.1	-
15-09-79	36	2	37	0	0	1	17.4	-
Total	3930	127	4057	28	2	17		

*Water levels not recorded.

Table 19. Timing of Atlantic salmon migrations through Great Rattling Brook fishway, 1960-79.

Year	First Adult recorded	Peak Migration	Last Adult recorded	Period of Operation
1960	18 July	23 Aug -03 Sept	10 Sept	03 July-15 Oct
1961	19 July	13 Aug -19 Aug	20 Oct	05 July-11 Nov
1962	19 July	12 Aug -18 Aug	22 Sept	10 July-06 Oct
1963	23 July	11 Aug -17 Aug	05 Oct	23 July-31 Oct
1964	09 July	02 Aug -08 Aug	09 Oct	08 July-10 Oct
1965	13 July	25 July-31 July	18 Oct	13 July-23 Oct
1966	11 July	24 July-30 July	14 Sept	10 July-14 Sept
1967	01 July	06 Aug -12 Aug	23 Sept	01 July-23 Sept
1968	14 July	04 Aug -10 Aug	27 Sept	14 July-26 Oct
1969	06 July	27 July-02 Aug	26 Sept	06 July-25 Oct
1970	06 July	26 July-01 Aug	24 Sept	06 July-30 Sept
1971	03 July	25 July-31 Aug	04 Sept	27 June-04 Sept
1972	09 July	06 Aug -12 Aug	31 Aug	09 July-31 Aug
1973+	-	-	-	-
1974+	-	-	-	-
1975	09 July	02 Aug -09 Aug	10 Sept	09 July-10 Sept
1976	16 July	25 July-31 July	08 Oct	15 July-08 Oct
1977	09 July	17 July-23 July	22 Sept	08 July-23 Sept
1978	13 July	16 July-22 July	30 Sept	12 July-02 Oct
1979	03 July	22 July-28 July	12 Sept	03 July-12 Sept

+No count obtained.

EXPLOITS RIVER (Cont'd) River code 0707790

Grand Falls Fishway

The Grand Falls fishway was constructed in 1972-73 and has had only limited success in collecting fish for the spawning channel at Noel Paul's Brook (Table 20). High water discharge in the fishway have contributed to the problem but pollution from the nearby paper mill is believed to inhibit salmon from moving up into the fishway. Weekly counts of salmon obtained at the site for 1977-79 are given in Table 21 and periods of migration in Table 22.

Table 20. Escapement of Atlantic salmon and other fishes through the Grand Falls fishway, 1974-79.

Year	Atlantic Salmon		Total	% Grilse	Brook Trout		Smelt	Ouananiche
	Grilse	Salmon			Sea Run	Resident		
1974	64	0	64	100	7	15	0	0
1975	321	19	340	94	9	5	6	0
1976	128	4	132	97	18	2	3	0
1977	243	9	252	96	3	0	0	0
1978	132	6	138	96	0	6	0	8
1979	455	7	462	98	48	0	0	12

1974 - 28 transferred to Noel Paul
31 transferred over dam
5 dead in trap
64 total

1975 - 315 transferred to Noel Paul
5 mortalities due to handling
5 mortalities in trap
1 transferred above Grand Falls dam
2 transferred to Aspen Brook
12 missing (possibly escaped trap)
340 total

1976 - 129 transferred to Noel Paul
3 mortalities due to handling
132 total

1977 - 227 transferred to Noel Paul
25 transferred above dam
252 total

1978 - 94 transferred to Noel Paul
44 transferred above dam
138 total

1979 - 462 transferred Noel Paul

+ Partial counts

NOTE: Angling occurred below fishway.

Table 21. Weekly escapement of Atlantic salmon and other fishes through the Grand Falls fishway, 1977-79.

Week (ending)	1977 Escapement						Mean Water Temp (°C)	Mean* Water Height (cm)
	Atlantic Salmon			Brook Trout				
	Grilse	Salmon	Total	Sea Run	Resident	Ouananiche		
09-07-77	4	0	4	0	0	0	16.3	-
16-07-77	11	0	11	0	0	0	-	-
23-07-77	123	4	127	0	0	0	17.0	-
30-07-77	46	4	50	0	0	0	14.5	-
06-08-77	27	0	27	0	0	0	18.5	-
13-08-77	19	1	20	0	0	0	16.8	-
20-08-77	5	0	5	0	0	0	15.9	-
27-08-77	5	0	5	0	0	0	16.0	-
03-09-77	2	0	2	2	0	0	16.6	-
10-09-77	0	0	0	1	0	0	13.0	-
17-09-77	1	0	1	0	0	0	12.9	-
24-09-77	0	0	0	0	0	0	9.7	-
Total	243	9	252	3	0	0		

* Water levels not recorded

Table 21. Cont'd.

Week (ending)	1978 Escapement						Mean Water Temp (°C)	Mean* Water Height (cm)
	Atlantic Salmon			Brook Trout				
	Grilse	Salmon	Total	Sea Run	Resident	Ouananiche		
15-07-78	15	1	16	0	0	0	18.8	-
22-07-78	66	4	70	0	0	0	20.0	-
29-07-78	9	0	9	0	0	0	18.7	-
05-08-78	10	0	10	0	0	0	20.0	-
12-08-78	0	0	0	3	0	1	20.0	-
19-08-78	4	1	5	0	0	0	19.0	-
26-08-78	2	0	2	3	0	1	17.7	-
02-09-78	3	0	3	0	0	0	18.7	-
09-09-78	2	0	2	0	0	0	13.9	-
16-09-78	7	0	7	0	0	0	9.1	-
23-09-78	10	0	10	0	0	4	10.1	-
30-09-78	4	0	4	0	0	0	11.5	-
07-10-78	0	0	0	0	0	2	-	-
Total	132	6	138	6	0	8		

* Water levels not recorded

Table 21. Cont'd.

Week (ending)	1979 Escapement						Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout				
	Grilse	Salmon	Total	Sea Run	Resident	Ouananiche		
07-07-79	4	0	4	0	0	12	16.3	90.0
14-07-79	51	2	53	0	0	0	16.3	-
21-07-79	94	4	98	36	0	0	15.8	-
28-07-79	59	1	60	12	0	0	19.0	-
04-08-79	117	0	117	0	0	0	19.8	-
11-08-79	118	0	118	0	0	0	17.8	-
18-08-79	12	0	12	0	0	0	16.5	-
25-08-79	0	0	0	0	0	0	-	-
01-09-79	0	0	0	0	0	0	-	-
Total	455	7	462	48	0	12		

Table 22. Timing of the Atlantic salmon migration at the Grand Falls collection facility, 1974-79.

Year	First Adult recorded	Peak Migration	Last Adult recorded	Period of Operation
1974	29 July	04 Aug -10 Aug	11 Sept	21 July-14 Sept
1975	09 July	20 July-26 July	09 Sept	02 July-10 Sept
1976	18 July	01 Aug-07 Aug	04 Sept	15 July-20 Sept
1977	07 July	17 July-23 July	16 Sept	07 July-22 Sept
1978	12 July	16 July-22 July	25 Sept	12 July-02 Oct
1979	05 July	05 Aug-11 Aug	18 Aug	04 July-01 Sept

EXPLOITS RIVER (Cont'd) River code 0707790

Counting fences

Since 1969 counting fences have been installed and operated intermittently on a number of small tributaries draining into the Exploits River. Fences have been constructed of both netting and metal conduit and designed to monitor the migration of both indigenous fish populations and progeny of adults from the Noel Paul's spawning channel. Table 23 summarizes data obtained at these fences.

Table 23. Fish counts from temporary counting fences operated on tributaries of the Exploits River, 1969-79.

Tributary	Year	Atlantic Salmon					Brook Trout	Ouananiche	Stickleback
		Grilse	Salmon	Kelt	Smolt	Parr			
Stoney Brook	1969	1							
	1970	3			2386*				
	1971				753*				
	1972	3							
	1973				4157		11		
	1979*	431	16				2		
Veneer Brook	1970					772	30		
	1971					8	6		16
	1972				14	111	42		26
	1973					785+			
Little Red Indian Brook	1976				218**	258**	130		204
	1977				172**	4954++	206		149
	1978				217++	3542++	199		
	1979				3538++	4436++	183		70
Noel Paul's Brook	1970				1000+				
	1971				4400+				
	1972*				2978				
	1973*			10	8400	1400	30		
	1974*			42	4998	2548	55	75	
	1978			102	5171	5064	52		

* (Partial count)
** Ouananiche
\+ (Known count + estimate)
++ Ouananiche and anadromous

RATTLING BROOK River code 0707810

Counting fence

Rattling Brook is located on the northeast coast of insular Newfoundland (Fig. 1). Prior to 1957, it drained approximately 160 km^2 and it was 30 km long. However, in 1957, the river was blocked by a hydroelectric dam and at present, except for a short section below the power house, it is mostly dry riverbed.

Before the impoundment, Rattling Brook was estimated to have an annual river escapement of 700-900 Atlantic salmon. Because construction of a fishway or spawning channel at the hydroelectric site was felt to be too costly, the Rattling Brook salmon were captured by means of a counting fence and transferred to Great Rattling Brook, a tributary of the Exploits River.

The details and success of the transfer and subsequent establishment of a viable salmon run to Great Rattling Brook has been document by Sturge (1966), Pratt et al. (1973) and Farwell and Porter (1976). This report presents the data obtained at the counting fence between 1956 and 1965 (Table 24).

Table 24. Numbers of Atlantic salmon recorded at the Rattling Brook counting fence and transferred to Great Rattling Brook, 1956-65.

	Escapement				Transfer		
Year	Grilse	Salmon	Total	% Grilse	Total transferred including mortality (to Great Rattling Brook)	Mortality	% Mortality
1956*	372	224	596	62	0	0	0
1957	439	188	627	70	627	25	4.0
1958	680	128	808	84	808	22	2.7
1959+	333	73	406	82	336	7	2.1
1960	600	112	712	84	696	14	2.0
1961	212	51	263	81	256	2	0.8
1962	130	21	151	86	151	7	4.6
1963	44	7	51	86	51	1	1.9
1964	19	3	22	86	18	0	0
1965	Size unknown		5	-			

*Partial count.

+Of the 406 escapement, 336 were transferred to Great Rattling Brook and 70 were transferred to Bishop's Falls.

DOG BAY RIVER River code 0708480

Counting Fence

Dog Bay River flows northeast into Hamilton Sound, Notre Dame Bay. It drains an area of 364.4 km^2 and has a main stem length of 50.9 km. In 1972 a counting fence was installed on the system to determine its suitability as a donor stream of Atlantic salmon brood stock. If the system was found to have surplus stock, adult salmon were to be transferred for an enhancement program on the Exploits River.

The counting fence was positioned approximately 4.8 km from the river mouth and operated from 30 June to 14 October. During the period, 391 grilse and 207 large salmon were recorded. The first adult was enumerated on the 30 June and the last on 8 October, with peak migration occurring between 16-22 July. Because of the delay in fence installation and the distance between the fence and the river mouth, the 1972 salmon count is not considered to represent the entire annual migration to Dog Bay River (Traverse 1973). The number of large salmon recorded also suggest some problem with the sizing of migrants, the number is not consistent with the angling data (Table 25).

Table 25. Angled catch, effort and catch per unit effort of Atlantic salmon, in Dog Bay River, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	0	0	0	0	0.0	0
1954	4	2	0	2	0.50	100
1955	12	7	0	7	0.58	100
1956	5	0	0	0	0.0	0
1957	22	9	0	9	0.41	100
Mean 1953-57	8.6	3.6	0.0	3.6	0.42	100
1958	12	6	0	6	0.50	100
1959	0	0	0	0	0.0	0
1960	0	0	0	0	0.0	0
1961	0	0	0	0	0.0	0
1962	46	17	0	17	0.37	100
Mean 1958-62	11.6	4.6	0.0	4.6	0.40	100
1963	448	73	2	75	0.17	97
1964	536	219	3	222	0.41	99
1965	1062	132	0	132	0.12	100
1966	712	156	0	156	0.22	100
1967	669	190	0	190	0.28	100
Mean 1963-67	685.4	154.0	1.0	155.0	0.23	99
1968	825	291	0	291	0.35	100
1969	999	240	0	240	0.24	100
1970	1203	294	0	294	0.24	100
1971	714	163	0	163	0.23	100
1972	665	161	0	161	0.24	100
Mean 1968-72	881.2	229.8	0.0	229.8	0.26	100
1973	1205	154	0	254	0.26	100
1974	1585	177	1	178	0.11	99
1975	1145	134	6	140	0.12	96
1976	1250	139	0	139	0.11	100
1977	981	190	5	195	0.20	97
Mean 1973-77	1233.2	178.8	2.4	181.2	0.15	99
1978	849	166	0	166	0.20	100
1979	195	32	0	32	0.16	100

GANDER RIVER River code 0908610

Counting Fences

Details on the design and operation of two counting fences on the Gander River (Fig. 1) are available in Anon. (1951) and Mercer and Anderson (1974).

A counting fence was installed on the lower Gander River in 1951 as part of a preliminary investigation on the life history of Atlantic salmon in Newfoundland and Labrador. It was operated from 7 June to 30 September but a washout occurred in August and a proportion of the salmon migration was missed. A total of 9700 salmon were enumerated of which 79.6% were judged to be grilse. The total estimated river escapment, based on migration rate, was 12,000 fish (Anon. 1951).

In 1973, a counting fence was installed on the Northwest Gander, a major tributary of the Gander River flowing into Gander Lake. Installation of the fence was in conjunction with a salmon enhancement program on the Exploits River. If sufficient numbers of salmon entered the tributary, surplus spawners were to be removed and transported to the Noel Paul's Spawning Channel. The fence was operated from 5 June to 18 August during which time 603 grilse and 25 large salmon were enumerated. The count was not complete due to several fence washouts. The estimated annual run based on migration rate through the fence and anglers catch (Table 26) was in the range of 1000-1500 fish (Mercer and Anderson 1974). This number was judged insufficient to permit removal of adults for the enhancement program.

Table 26. Angled catch, effort and catch per unit effort of Atlantic salmon, in Gander River, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	2430	976	382	1358	0.56	72
1954	1831	370	207	577	0.32	64
1955	1010	738	206	944	0.93	78
1956	2250	1647	303	1950	0.87	84
1957	2815	2374	473	2847	1.01	83
Mean 1953-57	2067.2	1221.0	314.2	1535.2	0.74	80
1958	2751	1950	417	2367	0.86	82
1959	2391	2273	409	2682	1.12	85
1960	2466	1785	368	2153	0.87	83
1961	1794	1035	107	1142	0.64	91
1962	2042	1847	345	2192	1.07	84
Mean 1958-62	2288.8	1778.0	329.2	2107.2	0.92	84
1963	1972	1044	167	1211	0.61	86
1964	2762	2731	436	3167	1.15	86
1965	2310	1171	253	1424	0.62	82
1966	2322	2034	127	2161	0.92	94
1967	2096	1348	32	1380	0.66	98
Mean 1963-67	2292.4	1665.6	203.0	1868.6	0.82	89
1968	1981	1130	64	1194	0.60	95
1969	2680	858	3	861	0.32	100
1970	2388	1308	3	1311	0.55	100
1971	2142	1048	33	1081	0.50	97
1972	3197	1267	3	1270	0.40	100
Mean 1968-72	2477.6	1122.2	21.2	1143.4	0.46	98
1973	3047	1837	0	1837	0.60	100
1974	5153	2270	19	2289	0.44	99
1975	6670	2976	38	3014	0.45	99
1976	6633	2374	132	2506	0.38	95
1977	6939	2269	927	3196	0.46	71
Mean 1973-77	5688.4	2345.2	223.2	2568.4	0.45	91
1978	8322	3352	389	3721	0.45	90
1979	7217	4199	318	4517	0.63	93

SALMON BROOK (GANDER RIVER) River code 0908610

Fishway

Details on design of the Salmon Brook fishway (Fig. 1) and background information on fishway operations prior to 1977 are given in Anon. (1958-62), and Traverse (1972, 1973). A record of fish enumerated at Salmon Brook from 1957 to 1979 is given in Table 27.

In 1977, there was insufficient funds to enumerate Atlantic salmon utilizing Salmon Brook fishway. In 1978, enumeration was resumed and 807 adult salmon were recorded. The migration comprised of 755 grilse and 52 large salmon (Table 28). Low water levels were a problem in 1978, and at times during the season, prevented salmon from reaching the fishway. This may have delayed the migration and additional migrants may have used the fishway after enumeration was terminated in September.

Poaching was another serious problem at Salmon Brook fishway during 1978. Numerous attempts were made to remove salmon from the fishway and acts of vandalism were common. The numbers of salmon taken during these incidents are unknown.

In 1979, the Salmon Association of Eastern Newfoundland (S.A.E.N.) were awarded a contract to operate a number of fishways in insular Newfoundland. Salmon Brook fishway was among these facilities and enumeration of adult salmon was undertaken by their staff from 28 June to 21 September. The problem of low water levels was even more acute in 1979 than the previous year, and with the exception of two fish that moved through the fishway in late July, no fish could enter Salmon Brook from the Gander River until mid-August. A total of 410 salmon were eventually enumerated but the high count in September suggests that it is only a partial count (Table 28). It was also suspected that a large number of fish moved directly upstream via the falls. Examination of migration periods during previous years indicate that the timing fluctuates widely (Table 29) and may be influenced by water discharge.

Poaching and vandalism at the facility in 1979 were only minor problems, alleviated in part by the installation of metal grating over the fishway.

The recreational fishery on Salmon Brook was closed for a portion of the angling season in both 1978 and 1979 due to the low water levels (Table 30).

Table 27. Escapement of Atlantic salmon and other fishes+ through the Salmon Brook fishway, 1957-61, 1971-74, 1978-79.

	Atlantic Salmon				Brook Trout		
Year	Grilse	Salmon*	Total	% Grilse	Resident	Sea Run	Eels
1957	642	323	965	66	-	-	-
1958	1072	502	1574	68	-	-	-
1959	591	290	881	67	-	-	-
1960	291	183	474	61	-	-	-
1961	41	15	56	73	-	-	-
1962-70	NC	NC	NC	NC	NC	NC	NC
1971	714	494	1208	59	25	0	4
1972	541	53	594	91	0	0	0
1973	970	135	1105	88	11	0	4
1974	862	8	870	99	2	0	0
1975-77	NC	NC	NC	NC	NC	NC	NC
1978	755	52	807	94	4	1	0
1979**	404	6	410	99	0	0	0

*Doubt exists as to the validity of the large salmon counts prior to 1978.

**Partial counts.

+Incomplete counts.

NC-No counts, fishway not operated due to manpower shortage.

NOTE: Angling occurred above and below fishway.

Table 28. Weekly escapement of Atlantic salmon and other fishes through the Salmon Brook fishway, 1978-79.

Week (ending)	1978 Escapement					Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout			
	Grilse	Salmon	Total	Resident	Sea Run		
01-07-78	5	1	6	1	1	18.0	31.8
08-07-78	74	10	84	0	0	16.2	31.5
15-07-78	156	3	159	0	0	20.8	30.1
22-07-78	116	8	124	0	0	21.4	26.6
29-07-78	160	3	163	1	0	20.0	25.4
05-08-78	42	0	42	0	0	20.7	20.3
12-08-78	4	0	4	0	0	18.6	7.1
19-08-78	3	0	3	0	0	17.2	4.9
26-08-78	0	0	0	0	0	16.6	4.1
02-09-78	0	0	0	0	0	14.8	1.9
09-09-78	0	0	0	0	0	13.0	6.4
16-09-78	45	0	45	0	0	10.5	15.7
23-09-78	150	27	177	2	0	10.7	34.6
Total	755	52	807	4	1		

Table 28. Cont'd.

Week (ending)	1979 Escapement					Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout			
	Grilse	Salmon	Total	Resident	Sea Run		
30-06-79	0	0	0	0	0	17.6	37.2
07-07-79	0	0	0	0	0	18.3	32.8
14-07-79	0	0	0	0	0	16.4	28.8
21-07-79	0	0	0	0	0	16.6	35.4
28-07-79	2	0	2	0	0	18.9	37.7
04-08-79	0	0	0	0	0	19.7	36.7
11-08-79	0	0	0	0	0	17.8	32.9
18-08-79	15	0	15	0	0	15.2	33.7
25-08-79	154	2	156	0	0	16.2	47.9
01-09-79	95	3	98	0	0	17.4	52.4
08-09-79	66	0	66	0	0	15.7	51.4
15-09-79	34	1	35	0	0	15.3	53.8
22-09-79	38	0	38	0	0	14.7	57.6
Total	404	6	410	0	0		

Table 29. Timing of the Atlantic salmon migrations at the Salmon Brook fishway, 1957-61, 1971-74, and 1978-79.

Year	First adult recorded	Peak migration	Last adult recorded	Period of Operation
1957	01 July	27 July-03 Aug	04 Sept	22 June-21 Sept
1958	08 June	20 July-26 July	27 Sept	02 June-01 Nov
1959	29 June	06 Sept-12 Sept	06 Oct	08 June-31 Oct
1960	19 June	17 July-23 July	08 Nov	02 June-12 Nov
1961	23 June	09 July-15 July	31 Aug	12 June-24 Oct
1971	25 June	01 Aug -07 Aug	16 Sept	25 June-15 Oct
1972	01 July	16 July-22 July	09 Oct	18 June-15 Oct
1973	22 June	14 July-20 July	18 Sept	17 June-21 Sept
1974	03 July	01 Aug -07 Aug	24 Sept	30 June-28 Sept
1978	29 June	23 July-29 July	23 Sept	28 June-23 Sept
1979	25 July	19 Aug -25 Aug	21 Sept	28 June-21 Sept

Table 30. Angled catch, effort and catch per unit effort of Atlantic salmon, Salmon Brook, 1975-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1975	134	3	0	3	0.02	100
1976	246	15	0	15	0.06	100
1977	507	60	0	60	0.15	100
1978*	566	35	0	35	0.06	100
1979*	236	24	0	24	0.10	100

*Partial season.

MIDDLE BROOK River code 1109760

Fishway

A brief history and design of the Middle Brook fishway are given by Porter and Davis (1974) and Moores (1978). Details of fishway operations prior to 1977 are available in Anon. (1956, 1957b-1960), Traverse (1973), Porter and Davis (1974), Pepper et al. (1975).

The migration of Atlantic salmon at the Middle Brook fishway was not monitored in 1977. The facility was however operational. Enumeration of migrants was resumed in 1978. A total of 1428 Atlantic salmon were recorded of which 16 were large salmon (Table 31). Peak migration occurred during the week ending 22 July (Table 32). There were no major operational problems experienced at the fishway in 1978 although low water levels may have delayed fish migration. Poaching on Middle Brook was a serious problem and a large number of salmon were probably removed from the river. Poachers also broke into the fishway on two occasions and removed an unknown number of fish.

The recreational fishery took 391 grilse and one large salmon from Middle Brook in 1978. Effort totalled 1322 rod days with a catch per unit effort (CUE) of 0.30 (Table 33).

Operation of the Middle Brook fishway in 1979 was undertaken by S.A.E.N. This organization operated the facility from 25 June to 12 September. A total of 1404 Atlantic salmon were enumerated of which 54 were large salmon. Twenty-one adults were enumerated on the first day of operation which suggest that a number of fish moved upstream before enumeration began (Table 31). Peak migration occurred from 15 July to 21 July (Table 32).

Poachers again caused problems at the fishway in 1979. They broke into the counting trap on at least three occasions and removed an unknown number of fish. Poaching in the river was reported to be a major problem; a situation that was compounded by extremely low water levels and high water temperatures. Installation of metal grating over the fishway in 1979 reduced poaching and vandalism problems at the fishway.

The recreational fishery at Middle Brook was closed for all but four weeks in 1979 due to low water levels and high water temperatures. Anglers did however manage to take 28 grilse during the short season (Table 33).

Despite poaching, and probably as a result of a fine effort by the counting trap attendants in operating the fishway coupled with new fisheries regulations that reduced salmon by-catch in herring and mackerel nets in the area, record numbers of Atlantic salmon passed through the Middle Brook fishway in both 1978 and 1979 (Table 34).

Table 31. Weekly escapement of Atlantic salmon and other fishes through the Middle Brook fishway, 1978-79.

Week (ending)	1978 Escapement						Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout				
	Grilse	Salmon	Total	Resident	Sea Run	Eels		
01-07-78	60	4	64	0	0	0	19.9	146.3
08-07-78	249	1	250	1	0	0	16.9	109.3
15-07-78	257	0	257	10	0	0	21.1	75.3
22-07-78	335	4	339	5	5	0	21.8	57.8
29-07-78	243	3	246	0	0	0	17.5	50.1
05-08-78	164	0	164	0	5	0	21.0	43.9
12-08-78	5	0	5	0	25	0	19.0	35.1
19-08-78	40	0	40	9	6	0	18.6	30.7
26-08-78	23	0	23	5	5	0	15.8	31.5
02-09-78	29	4	33	0	0	0	14.4	32.5
09-09-78	6	0	6	0	0	0	14.0	33.3
16-09-78	1	0	1	0	0	0	10.3	33.3
23-09-78	0	0	0	0	0	0	9.3	33.3
Total	1412	16	1428	30	46	0		

Table 31. Cont'd.

Week (ending)	1979 Escapement*						Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout				
	Grilse	Salmon	Total	Resident	Sea Run	Eels		
30-06-79	21	0	21	0	0	0	18.2	115.0
07-07-79	197	16	213	2	2	0	19.8	100.7
14-07-79	245	19	264	4	1	1	20.8	100.0
21-07-79	403	10	413	2	0	0	18.8	99.8
28-07-79	124	4	128	3	2	0	19.4	113.4
04-08-79	54	1	55	0	0	0	22.3	107.1
11-08-79	59	0	59	0	2	0	20.6	103.9
18-08-79	78	2	80	0	1	0	18.7	101.8
25-08-79	55	1	56	0	0	0	16.5	111.3
01-09-79	48	0	48	2	0	0	15.9	99.1
08-09-79	46	1	47	1	0	0	14.1	121.6
15-09-79	20	0	20	0	0	0	13.5	138.4
Total	1350	54	1404	14	8	1		

*Partial record.

Table 32. Timing of the Atlantic salmon migrations at the Middle Brook fishway, 1956-59, 1972-75, and 1978-79.

Year	First Adult recorded	Peak Migration	Last Adult recorded	Period of Operation
1956	25 June	15 July-21 July	06 Sept	24 June-22 Sept
1957	12 July	28 July-03 Aug	07 Sept	22 June-28 Sept
1958	07 July	13 July-19 July	29 Aug	06 July-26 Sept
1959	07 July	26 July-01 Aug	13 Oct	28 June-13 Oct
1972	02 July	16 July-22 July	20 Sept	02 July-3[illegible] Sept
1973	25 June	15 July-21 July	22 Sept	17 June-22 Sept
1974	29 June	21 July-27 July	05 Oct	22 June-24 Oct
1975	25 June	13 July-19 July	12 Sept	25 June-13 Sept
1978	25 June	16 July-22 July	15 Sept	25 June-23 Sept
1979	30 June	15 July-21 July	12 Sept	25 June-12 Sept

Table 33. Angled catch, effort and catch per unit effort of Atlantic salmon, Middle Brook, 1952-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1952	894	71	1	72	0.08	99
1953	710	116	0	116	0.16	100
1954	360	57	0	57	0.16	100
1955	134	29	1	30	0.23	97
1956	923	95	7	102	0.32	93
Mean 1952-56	604	74	2	76	0.12	99
1957	289	144	0	144	0.50	100
1958	459	172	2	174	0.38	99
1959	427	160	4	164	0.38	98
1960	334	58	0	58	0.17	100
1961	208	30	2	32	0.15	94
Mean 1957-61	343	113	2	115	0.34	98
1962	459	174	0	174	0.38	100
1963	638	350	0	350	0.55	100
1964	1266	570	0	570	0.45	100
1965	1568	454	2	456	0.29	99
1966	1627	272	0	272	0.17	100
Mean 1962-61	1112	364	1	365	0.33	99
1967	965	217	0	217	0.22	100
1968	2014	374	0	374	0.19	100
1969	1704	389	2	391	0.23	99
1970	1111	323	2	325	0.29	99
1971	662	185	0	185	0.28	100
Mean 1967-71	1291	298	1	299	0.23	99
1972	287	224	0	224	0.78	100
1973	213	283	0	283	1.33	100
1974	1823	277	11	288	0.16	96
1975	1635	415	8	423	0.25	98
1976	1339	280	2	282	0.21	99
Mean 1972-76	1059	296	4	300	0.28	99
1977	1511	767	3	770	0.51	100
1978	1322	391	1	392	0.30	99
1979*	211	28	0	28	0.13	100

* Partial season only

Table 34. Escapement of Atlantic salmon and other fishes through the Middle Brook fishway, 1956-59, 1972-75 and 1978-79.

Year	Atlantic salmon				Brook Trout		Eels	Others
	Grilse	Salmon	Total	% Grilse	Resident	Sea Run		
1956*	324	56	380	85	-	-	-	-
1957*	28	2	30	93	-	-	-	-
1958*	332	231	563	59	-	-	-	-
1959*	295	13	308	96	-	-	-	-
1972	838	10	848	99	-	-	-	-
1973*	1079	9	1088	99	-	20	-	-
1974*	770	77	847	91	1	8	-	-
1975*	1119	9	1128	99	-	-	-	-
1978	1412	16	1428	99	30	46	-	-
1979*	1350	54	1404	96	14	8	1	-

*Partial counts

NOTE: Angling occurred above and below fishway.

TERRA NOVA RIVER River code 1110220

Fishways

Background information on the two Terra Nova River fishways (Fig. 1) is given in Anon. (1956, 1957b-1965), Peet (1966), Anon. (1967-69), Riche and Traverse (1970, 1971), Traverse (1972, 1973), Pratt et al. (1973), Porter and Davis (1974), Pepper et al. (1975), and Moores (1978).

In 1977, salmon migration was monitored only at the upper fishway. The operation period for this facility was from 2 July to 27 August. A total of 633 adult salmon were counted of which 262 were recorded as large salmon (Table 35). There is however some doubt as to the validity of the large salmon count as it was disproportionally greater than the recreational fishery. Peak migration occurred during the week ending 23 July (Table 36). There were no major problems at the fishway in 1977 and fish numbers appear comparable with previous years (Table 37).

In 1978 salmon were enumerated at both the upper and lower fishways. It was the first time in five years that salmon were enumerated at the lower fishway and, although poachers are known to have taken some adults, no major problems were encountered. Extremely low water levels in 1978 led to closure of the recreational fishery but an overflow dam located near the fishway directed sufficient water to permit continuous operation of the facility. The total count of adult salmon was 830 of which only 20 were large salmon (Table 38).

At the upper fishway 436 grilse and 88 large salmon were counted in 1978 (Table 35). Again the validity of the large salmon count is questionable considering that only 20 large salmon were enumerated at the lower facility. Operations in 1978 were conducted without poaching problems and the only fish mortality occurred when two fish were crushed under the trap. Peak migration was from 23 July to 29 July. This was comparable to previous years (Table 36).

In 1979 fish migration was again monitored at both fishways. Operations were under contract to S.A.E.N. and with the exception of four mortalities, and a reluctance of some migrants to enter the counting trap at the lower facility, no major problems were encountered.

The total 1979 count at the lower fishway was 739 salmon of which 170 were large salmon (Table 38). Peak migration was recorded during the week of 21 July (Table 39). Enumeration at the upper fishway showed 485 salmon of which 30 were large salmon (Table 35). A peak in migration was not apparent for 1979 and the 13 fish counted during the last week of fishway operation indicated that the migration had not been completed when enumeration was stopped on 3 September.

Examination of 1977-79 fishway counts in Terra Nova River suggest little change in stock size in Terra Nova River. The mean 1978-79 count for the lower fishway was 784 fish (Table 40). This was only 8% below the mean 1971-73 count and, considering that migrants can move directly over the falls, it was not

thought to represent any major change in migration size. The mean 1977-79 count for the upper fishway was 548 salmon. This is comparable to the 1970-74 mean of 509 but does suggest an upward trend (Table 37).

Angling data for this river shows an increase in success rate for the period 1977-79 over previous years which had low water levels. Increased emphasis on data collection may partly account for the increase of recorded numbers of fish angled (Table 41).

Table 35. Weekly escapement of Atlantic salmon through the upper fishway, Terra Nova River, 1977-79.

Week (ending)	1977 Escapement: Atlantic Salmon Grilse	Salmon	Total	Mean Water Temp (°C)	Mean Water Height (cm)
09-07-77	3	0	3	-	-
16-07-77	51	31	82	21.3	-
23-07-77	114	98	212	-	-
30-07-77	72	66	138	-	-
06-07-77	43	38	81	-	-
14-08-77	50	23	73	-	-
20-08-77	30	6	36	-	-
27-08-77	8	0	8	-	-
Total	371	262	633		

Table 35. Cont'd.

Week (ending)	1978 Escapement: Atlantic Salmon Grilse	Salmon	Total	Mean Water Temp (°C)	Mean Water Height (cm)
08-07-78	3	0	3	17.4	44.3
15-07-78	47	29	76	19.9	47.9
22-07-78	101	42	143	20.3	55.0
29-07-78	128	11	139	18.4	52.9
05-08-78	62	1	63	20.2	50.0
12-08-78	29	0	29	20.0	47.5
19-08-78	32	5	37	18.7	51.8
26-08-78	17	0	17	16.8	44.1
02-09-78	17	0	17	15.7	46.4
09-09-78	0	0	0	17.4	43.8
Total	436	88	524		

Table 35. Cont'd.

Week (ending)	1979 Escapement			Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon				
	Grilse	Salmon	Total		
07-07-79	13	2	15	18.5	36.9
14-07-79	29	0	29	17.5	39.6
21-07-79	50	0	50	17.4	45.9
28-07-79	51	3	54	19.1	47.1
04-08-79	77	5	82	19.9	47.5
11-08-79	68	6	74	19.9	49.3
18-08-79	55	7	62	17.1	48.6
25-08-79	55	2	52	16.3	46.4
01-09-79	50	4	54	17.0	52.7
08-09-79	12	1	13	14.5	58.8
Total	455	30	485		

Table 36. Timing of the Atlantic salmon migration at the upper fishway, Terra Nova River, 1955-79.

Year	First adult recorded	Peak migration	Last adult recorded	Period of Operation
1955	08 July	20 Aug -27 Aug	24 Sept	02 June-24 Sept
1956	23 July	28 July-04 Aug	20 Sept	07 July-11 Oct
1957	14 Aug	24 Aug -31 Aug	30 Aug	25 June-28 Sept
1958	05 Aug	03 Aug -09 Aug	08 Sept	29 June-30 Sept
1959	28 July	02 Aug -08 Aug	13 Sept	28 June-27 Oct
1960	18 July	28 Aug -03 Sep	20 Oct	01 July-29 Oct
1961	09 Aug	06 Aug -12 Aug	05 Nov	09 Aug -08 Nov
1962	20 July	06 Aug -12 Aug	06 Oct	21 June-13 Oct
1963	29 June	21 July-27 July	14 Sept	22 June-08 Oct
1964	29 June	26 July-01 Aug	30 Sept	27 June-15 Oct
1965	26 June	18 July-24 July	29 Sept	16 June-04 Oct
1966	27 June	24 July-30 July	20 Sept	26 June-13 Oct
1967	01 July	23 July-29 July	14 Oct	24 June-14 Oct
1968	10 June	04 Aug -10 Aug	01 Nov	10 June-01 Nov
1969	06 July	27 July-02 Aug	02 Oct	25 June-09 Oct
1970	02 July	19 July-25 July	15 Oct	02 July-17 Oct
1971	26 June	25 July-31 July	12 Oct	20 June-16 Oct
1972	06 July	23 July-29 July	05 Oct	05 July-05 Oct
1973	07 July	15 July-21 July	27 Sept	24 June-29 Sept
1974	06 July	04 Aug -10 Aug	05 Oct	06 July-10 Oct
1975	28 June	12 July-19 July	20 Sept	15 June-12 Sept
1976	02 July	01 Aug -07 Aug	28 Aug	02 July-28 Aug
1977	08 July	16 July-23 July	27 Aug	02 July-27 Aug
1978	04 July	23 July-29 July	01 Sept	02 July-09 Sept
1979	21 July	29 July-04 Aug	03 Sept	02 July-03 Sept

Table 37. Escapement of Atlantic salmon and other fishes through the upper fishway, Terra Nova River, 1955-79.

Year	Escapement						
	Atlantic salmon				Brook trout		
	Grilse	Salmon	Total	% Grilse	Resident	Sea Run	Ouananiche
1955	53	24	77	69	-	-	-
1956	32	44	76	42	-	-	-
1957	21	1	22	95	-	-	-
1958	10	0	10	100	4	0	0
1959	120	20	140	86	3	0	0
1960	86	0	86	100	5	0	0
1961	74	1	75	99	5	0	0
1962	284	4	288	99	21	0	0
1963	372	35	407	91	32	0	0
1964	246	18	264	93	160	0	0
1965	334	51	385	87	449	0	40
1966	134	2	136	99	80	0	0
1967	373	42	415	90	320	0	0
1968	409	28	437	94	61	0	0
1969	463	136	599	77	0	0	0
1970	563	170	733	77	0	0	0
1971	316	121	437	72	12	3	7
1972	330	202	532	62	8	10	0
1973	340	222	562	60	4	2	0
1974	161	122	283	57	2	0	2
1975	782	48	830	94	5	0	2
1976	346	37	383	90	0	0	0
1977	371	262	633	59	0	0	0
1978	436	88	524	83	0	0	0
1979	455	30	485	95	0	0	0

NOTE: Angling occurred above and below fishway.

Table 38. Weekly escapement of Atlantic salmon and brook trout through the lower fishway, Terra Nova River, 1978-79.

Week (ending)	1978 Escapement: Atlantic salmon Grilse	Salmon	Total	Brook Trout	Mean Water Temp (°C)	Mean Water Height (cm)
08-07-78	88	3	91	-	17.9	54.0
15-07-78	248	7	255	2	21.6	57.2
22-07-78	230	7	237	1	21.8	54.5
29-07-78	142	1	143	1	20.6	50.2
05-08-78	61	1	62	2	21.0	43.2
12-08-78	23	0	23	-	20.5	36.2
19-08-78	6	1	7	-	19.5	27.5
26-08-78	12	0	12	-	17.7	24.1
02-09-78	0	0	0	-	17.4	20.6
Total	810	20	830	6		

Table 38. Cont'd.

Week (ending)	1979 Escapement*: Atlantic salmon Grilse	Salmon	Total	Brook Trout	Mean Water Temp (°C)	Mean Water Height (cm)
07-07-79	44	6	50	0	19.8	33.0
14-07-79	42	10	52	0	18.9	28.3
21-07-79	94	20	114	0	12.1	30.4
28-07-79	76	18	94	1	19.0	30.5
04-08-79	69	16	85	2	21.8	32.0
11-08-79	54	13	67	2	20.9	29.6
18-08-79	76	35	111	1	17.0	26.0
25-08-79	46	27	73	0	17.4	25.8
01-09-79	21	6	27	0	17.8	32.1
08-09-79	33	16	49	0	16.9	46.5
13-09-79	14	3	17	0	19.5	54.0
Total	569	170	739	6		

* Partial count.

Table 39. Timing of Atlantic salmon migration at the lower fishway, Terra Nova River, 1956-79.

Year	First Adult recorded	Peak Migration	Last Adult recorded	Period of Operation
1956	26 June	28 July-04 Aug	30 Oct	23 June-28 Nov
1957	08 June	24 Aug-31 Aug	28 Sept	08 June-12 Oct
1958	29 June	20 July-26 July	08 Oct	28 June-18 Oct
1959	10 July	26 July-01 Aug	17 Oct	16 June-17 Oct
1960	27 June	10 July-16 July	30 Sept	14 June-03 Nov
1961	17 June	23 July-29 July	20 Oct	15 June-28 Oct
1962	26 June	29 July-04 Aug	29 Sept	21 June-13 Oct
1963	20 June	14 July-20 July	28 Sept	15 June-12 Oct
1964	14 June	26 July-01 Aug	30 Sept	14 June-08 Oct
1965	24 June	18 July-24 July	13 Sept	13 June-18 Sept
1966	19 June	17 July-23 July	03 Oct	17 June-15 Oct
1967	20 June	23 July-29 July	07 Oct	11 June-14 Oct
1968	20 June	22 July-28 July	17 Oct	12 June-01 Nov
1969	19 June	27 July-02 Aug	29 Sept	18 June-30 Sept
1970	21 June	12 July-18 July	21 Sept	15 June-26 Sept
1971	14 June	18 July-24 July	04 Oct	13 June-16 Oct
1972	22 June	09 July-15 July	08 Oct	19 June-08 Oct
1973	26 June	08 July-14 July	25 Sept	12 June-27 Sept
1974*				
1975*				
1976*				
1977*				
1978	02 July	09 July-15 July	24 Aug	02 July-06 Sept
1979	02 July	15 July-21 July	13 Sept	01 July-13 Sept

*No data obtained.

Table 40. Escapement of Atlantic salmon and other fishes through the lower fishway, Terra Nova River, 1956-79.

	Atlantic salmon				Brook trout		
Year	Grilse	Salmon	Total	% Grilse	Resident	Sea Run	Eels
1956	558	36	594	94	-	-	-
1957	141	41	182	77	0	0	1
1958	677	195	872	78	0	0	0
1959	394	67	461	85	0	0	0
1960	490	217	707	69	0	0	0
1961	318	99	417	76	0	0	0
1962	496	275	771	64	0	0	0
1963	551	320	871	63	0	0	0
1964	419	297	716	58	0	10	0
1965	474	254	728	65	0	38	0
1966	368	220	588	63	0	17	0
1967	613	359	972	63	0	12	0
1968	715	374	1089	66	0	10	0
1969	658	393	1051	63	0	11	0
1970	754	470	1224	62	0	8	0
1971	580	277	857	68	0	17	0
1972	609	348	957	64	0	14	0
1973	455	299	754	60	0	6	0
1974*							
1975*							
1976*							
1977*							
1978	810	20	830	98	6	0	0
1979	569	170	739	77	0	6	0

*No data obtained.

NOTE: Angling occurred above and below fishway.

Table 41. Angled catch, effort and catch per unit effort of Atlantic salmon, Terra Nova River, 1952-78.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1952	1421	119	23	142	0.09	84
1953	1706	151	13	164	0.10	92
1954	1003	72	13	85	0.08	85
1955	335	178	16	194	0.58	92
1956	2685	198	18	216	0.08	92
Mean 1952-56	1430	144	17	161	0.11	89
1957	569	73	3	76	0.13	96
1958	590	123	12	135	0.23	91
1959	959	120	20	140	0.15	86
1960	463	157	8	165	0.36	95
1961	623	117	14	131	0.21	89
Mean 1957-61	641	118	11	129	0.20	91
1962	777	254	25	279	0.36	91
1963	1160	274	29	303	0.26	90
1964	699	334	5	339	0.48	99
1965	787	327	10	337	0.43	97
1966	117	224	2	226	1.93	99
Mean 1962-66	708	283	14	297	0.42	95
1967	557	337	2	339	0.61	99
1968	143	319	12	331	2.31	96
1969	1477	523	0	523	0.35	100
1970	285	443	18	461	1.62	96
1971	1458	402	11	413	0.28	97
Mean 1967-71	784	405	9	413	0.53	98
1972	456	467	11	478	1.05	98
1973	1044	334	1	335	0.32	99
1974	2098	243	5	248	0.12	98
1975	1723	506	2	508	0.30	99
1976	1236	424	7	431	0.35	98
Mean 1972-76	1311	395	5	400	0.31	99
1977	1956	850	13	863	0.44	98
1978	1608	628	6	634	0.39	99
1979*	910	537	15	552	0.61	97

* partial record only

TERRA NOVA RIVER (Cont'd) River code 1110220

Counting Fence

Background information on fence design and operation are given by Anon. (1952).

A counting fence was installed on the Terra Nova River in 1952 as part of the preliminary investigation of the life history of Atlantic salmon in Newfoundland and Labrador. It was located a short distance above the river mouth and operated from 9 June to 29 September. During this period, 425 grilse and 26 large salmon were enumerated. Despite a brief washout this count was thought to represent the complete 1952 salmon migration to the river. The first fish was recorded on 14 June, the peak migration occurred during the week ending 26 July, and the last fish was released on 21 September. Anglers took 58 fish of the total released from the fence.

Monitoring of the smolt migration out of Terra Nova River was also attempted in 1952 but problems with holding the fyke nets and seines in position resulted in only 95 smolt being enumerated.

NORTHWEST RIVER (Port Blandford) River code 1210880

Fishway

Details on fishway construction and operation are given by Anon. (1949).

In 1948, a fishway was blasted at a falls on Northwest River approximately 3.2 km from the mouth. During constructon 48 salmon were observed utilizing the fishway. In 1949, a counting trap was installed on the fishway and 62 adult salmon enumerated. A river blockage by pulp logs is believed to have prevented additional migrants from reaching the fishway.

No count of salmon utilizing the facility has been obtained since 1949 but angling data has been collected since 1958 (Table 42).

Table 42. Angled catch, effort and catch per unit effort of Atlantic salmon, Northwest River, 1958-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1958	0	0	0	0	0.0	0
1959	84	47	0	47	0.56	100
1960	450	44	1	45	0.10	98
1961	181	7	0	7	0.04	100
1962	0	0	0	0	0.0	0
Mean 1958-62	143.0	19.6	0.2	19.8	0.14	99
1963	784	118	8	126	0.16	94
1964	182	142	7	149	0.82	95
1965	159	123	16	139	0.87	88
1966	231	154	2	156	0.68	99
1967	129	52	0	52	0.40	100
Mean 1963-67	297.0	117.8	6.6	124.4	0.42	95
1968	131	96	6	102	0.78	94
1969	198	180	7	187	0.94	96
1970	202	142	0	142	0.70	100
1971	1949	187	3	190	0.10	98
1972	175	118	2	120	0.69	98
Mean 1968-72	531.0	144.6	3.6	148.2	0.28	98
1973	908	119	6	125	0.14	95
1974	1134	65	0	65	0.06	100
1975	609	38	5	43	0.07	88
1976	1359	160	2	162	0.12	99
1977	1712	275	11	286	0.17	96
Mean 1973-77	1144.4	131.4	4.8	136.2	0.12	96
1978	2370	336	4	340	0.14	99
1979	571	57	0	57	0.10	100

NORTHEAST RIVER (PLACENTIA) River code 2903070

Fishway

Background information on the Northeast River fishway (Fig. 1) is presented by Traverse (1973), Porter and Davis (1974), Pepper et al. (1975), and Moores (1978).

In 1977, the Northeast River fishway was operable but the Atlantic salmon migration was not monitored.

Monitoring of the Atlantic salmon migration was resumed again in 1978. From 23 June to 11 September a total of 422 salmon were recorded. Thirty-two of these were large salmon (Table 43). Peak migration was from 15 July to 22 July (Table 44). Low water levels in 1978 delayed salmon migration in the river but there was sufficient water to operate the fishway. Poaching was a serious problem on Northeast River during the season. At least four attempts were made to remove salmon from the counting trap and at least one successful attempt was made to net the pool immediately below the facility. The numbers of salmon removed are unknown.

Despite unfavourable water conditions, the recreational fishery was fairly successful. The catch of 161 grilse has been exceeded only once since 1973 and the CUE of 0.13 was above the 1972-76 mean CUE of 0.12 (Table 45).

Fishway operation and monitoring of the Atlantic salmon migration in 1979 was conducted by SAEN. A total of 491 salmon were recorded of which 37 were large salmon (Table 43). The 1979 migration was a record one (Table 46) despite the extremely low water levels experienced again in 1979. Peak migration was recorded during the week ending 14 July (Table 44). There were no major problems experienced with fishway operation in 1979.

The recreational fishery on Northeast River was closed for a two week period because of low water levels. An angling effort of 969 rod days did however yield 138 grilse with a CUE of 0.14. This was comparable to the CUE since 1972 and suggests that a higher catch would have occurred without the river closure (Table 45).

Table 43. Weekly escapement of Atlantic salmon and other fishes through the Northeast River fishway, 1978-79.

Week (ending)	1978 Escapement				Mean Water Temp (°C)	Mean Water Height (cm)
	Atlantic Salmon			Brook Trout		
	Grilse	Salmon	Total	Resident		
24-06-78	0	0	0	0	17.3	40.0
01-07-78	7	0	7	0	18.0	41.4
08-07-78	44	0	44	0	16.1	39.3
15-07-78	100	4	104	0	18.4	28.8
22-07-78	97	9	106	0	18.8	29.8
29-07-78	63	7	70	0	18.8	10.8
05-08-78	28	4	32	0	16.9	28.6
12-08-78	18	4	22	0	16.4	25.7
19-08-78	5	2	7	0	15.9	20.0
26-08-78	16	0	16	0	13.2	25.4
02-09-78	5	1	6	1	13.1	24.2
09-09-78	4	1	5	0	10.6	36.7
15-09-78	3	0	3	0	8.3	40.8
Total	390	32	422	1		

Table 43 (Cont'd.)

Week (ending)	1979 Escapement			Mean Water Temp (°C)	Mean Water* Height (cm)
	Atlantic Salmon				
	Grilse	Salmon	Total		
23-06-79	8	0	8	18.2	-
30-06-79	17	0	17	19.1	-
07-07-79	51	0	51	16.5	-
14-07-79	128	6	134	18.7	-
21-07-79	60	7	67	19.6	-
28-07-79	83	10	93	18.5	-
04-08-79	53	6	59	15.3	-
11-08-79	20	2	22	-	-
18-08-79	12	3	15	-	-
25-08-79	13	0	13	-	-
01-09-79	6	2	8	-	-
08-09-79	3	1	4	-	-
Total	454	37	491		

*Water heights not recorded.

Table 44. Timing of Atlantic salmon migrations at the Northeast River fishway, 1968, 1972-76 and 1978-79.

Year	First Adult recorded	Peak Migration	Last Adult recorded	Period of Operation
1968+	10 July	14 July-20 July	20 July	09 July-20 July
1972	25 June	13 Aug-19 Aug	15 Sept	11 June-30 Sept
1973	04 July	08 July-14 July	10 Sept	21 June-29 Sept
1974	23 June	14 July-20 July	26 Aug	21 June-31 Sept
1975	09 July	20 July-26 July	13 Sept	28 June-30 Oct
1976	29 June	01 Aug-08 Aug	05 Sept	27 June-07 Sept
1978	26 June	15 July-22 July	06 Sept	23 June-11 Sept
1979	22 June	08 July-14 July	04 Sept	22 June-08 Sept

+Operated only two weeks due to washout.

Table 45. Angled catch, effort and catch per unit effort of Atlantic salmon, Northeast River, 1952-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1952	175	57	0	57	0.33	100
1953	219	24	3	27	0.12	89
1954	137	28	8	36	0.26	78
1955	153	61	5	66	0.43	92
1956	392	83	0	83	0.21	100
Mean 1952-56	215	51	3	54	0.25	91
1957	649	196	2	198	0.31	99
1958	175	79	14	93	0.53	85
1959	292	118	0	118	0.40	100
1960	399	80	0	80	0.20	100
1961	310	54	0	54	0.17	100
Mean 1957-61	367	105	3	108	0.30	96
1962	1135	46	0	46	0.04	100
1963	340	61	0	61	0.18	100
1964	345	66	5	71	0.21	93
1965	296	38	0	38	0.13	100
1966	282	163	0	163	0.58	100
Mean 1962-66	480	75	1	76	0.16	99
1967	504	62	3	65	0.13	95
1968	1467	125	0	125	0.09	100
1969	130	66	2	68	0.52	97
1970	111	77	3	80	0.72	96
1971	740	148	4	152	0.21	97
Mean 1967-71	590	96	3	99	0.17	97
1972	588	49	0	49	0.0	100
1973	1720	238	0	238	0.1	100
1974	1721	142	0	142	0.0	100
1975	877	121	4	125	0.14	97
1976	1164	147	1	148	0.13	99
Mean 1972-76	1214	139	1	140	0.12	99
1977	1465	180	1	181	0.12	99
1978	1237	161	0	161	0.13	100
1979	969	138	0	138	0.14	100

Table 46. Escapement of Atlantic salmon and other fishes through the Northeast River fishway, 1968, 1971-76 and 1978-79.

	Atlantic salmon				Brook Trout		
Year	Grilse	Salmon	Total	% Grilse	Resident	Sea Run	Eels
1968*	57	11	68	84	0	0	0
1969-70	NC	NC	NC	NC	NC	NC	NC
1971	159	21	180	88	0	0	0
1972	236	34	270	87	0	5	2
1973*	399	64	463	86	0	1	0
1974	224	9	233	96	0	0	0
1975*	186	36	222	84	0	0	0
1976	294	56	350	84	0	0	0
1977	NC	NC	NC	NC	NC	NC	NC
1978	390	32	422	92	1	0	0
1979	454	37	491	92	0	0	0

*Partial count.
NC-No count.

NOTE: Angling occurred above and below fishway.

NORTHEAST RIVER (PLACENTIA) River code 2903070

Counting fence

Fyke nets

In 1971, a counting fence was installed at km 0.8, to enumerate the river escapement of Atlantic salmon. The project was initiated to assess the potential of Northeast River to provide Atlantic salmon brood stock for future salmon enhancement projects on the Avalon Peninsula (Traverse 1972). The fence was operated from 17 June to 27 September, during which 159 grilse and 21 large salmon were counted. A partial washout prevented a complete count. Total river escapement was estimated to be 239 fish including: seven fish observed before fence installation, 20 fish thought to have moved upstream during the washout and 32 fish angled below the fence site.

In 1977, as part of a study of male precocity in Atlantic salmon, fyke nets were installed at the outlet of Fitzgerald's Pond, approximately 9.6 km from the mouth. The nets were fished from 2 May to 10 June, during which time 10,621 Atlantic salmon smolts were recorded. Problems with water discharge and debris prevented a complete count (Dalley 1979). In addition, 446 salmon parr, 95 brook trout and 90 eels were enumerated.

COME BY CHANCE RIVER River code 3003740

Counting Fence

Come by Chance River is located on the isthmus of the Avalon Peninsula (Fig. 1). It drains an area of 64.0 km^2 and has a main stem length of 17.2 km.

In 1970, a proposal was made to utilize the Come By Chance River system as a water supply for an industrial complex in the community of Come By Chance. A study was initiated in 1971 to assess the size of the fish population in the system. In 1971-72 a temporary metal counting fence was installed at the river mouth and both upstream and downstream migrants were monitored (Traverse 1972, 1973).

In 1971, the period of operation was from 5 May to 13 September. A total of 3552 Atlantic salmon smolts were enumerated moving downstream and 22 adult salmon comprised the upstream migration. Most of the latter were grilse (Table 47). Peak migration for the smolts was 9-15 May and for the adults from 27 June to 3 July (Table 48). Washouts due to high water permitted only a partial count of adult migration. The large number of smolts enumerated on the first day of fence operation also suggests that some smolts may have moved out to sea before fence installation.

In 1972, the counting fence was maintained from 10 May to 20 October. There were 8374 smolts and nine salmon recorded during this period (Table 47) but only the smolt count was considered to be complete (Traverse 1972). Problems with fence installation and high water levels allowed some adults to bypass the fence.

In 1971 and 1972, only nine and eight grilse respectively were angled on the Come By Chance River, in spite of 192 and 528 rod days of effort respectively. Data from previous years indicate that anglers had been more successful in other years (Table 49).

Plans for additional monitoring were discontinued when the closedown of the Come By Chance oil refinery made the requirements for additional water supply unnecessary.

Table 47. Escapement of Atlantic salmon adults and smolts through the Come By Chance River counting fence, 1971-72.

Year	Escapement			Smolts
	Grilse	Salmon	Total	
1971	20	2	22*	3552
1972	9	0	9*	8374

*Partial counts

Table 48. Timing of the Atlantic salmon adult and smolt migration at the Come By Chance River counting fence, 1971-72.

Year	Migration periods						Period of operation
	First fish recorded		Peak migration		Last fish recorded		
	smolt	adult	smolt	adult	smolt	adult	
1971	05 May	11 June	09-15 May	27 June-03 July	17 June	16 Aug	05 May-13 Sept
1972	12 May	30 June	04-10 June	02 July-08 July	28 June	10 Oct	10 May-20 Oct

Table 49. Angled catch, effort and catch per unit effort (CUE) of Atlantic salmon, Come By Chance River, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	138	10	7	17	0.12	59
1954	101	4	0	4	0.04	100
1955	49	11	0	11	0.22	100
1956	167	14	1	15	0.09	93
1957	14	5	0	5	0.36	100
Mean 1953-57	93.8	8.8	1.6	10.4	0.11	85
1958	26	3	0	3	0.12	100
1959	16	9	0	9	0.56	100
1960	15	4	0	4	0.27	100
1961	0	0	0	0	0.0	0
1962	64	11	0	11	0.17	100
Mean 1958-62	24.2	5.4	0.0	5.4	0.22	100
1963	228	18	1	19	0.08	95
1964	162	17	0	17	0.10	100
1965	200	4	0	4	0.02	100
1966	175	6	0	6	0.03	100
1967	348	6	0	6	0.02	100
Mean 1963-67	222.6	10.2	0.2	10.4	0.05	98
1968	232	14	0	14	0.06	100
1969	307	34	0	34	0.11	100
1970	229	7	0	7	0.03	100
1971	192	9	0	9	0.05	100
1972	528	8	0	8	0.02	100
Mean 1968-72	297.6	14.4	0.0	14.4	0.05	100
1973	442	44	1	45	0.10	98
1974	790	132	0	132	0.17	100
1975	337	46	0	46	0.14	100
1976	403	10	0	10	0.02	100
1977	267	4	0	4	0.01	100
Mean 1973-77	447.8	47.2	0.2	47.4	0.11	100
1978	606	88	13	101	0.17	87
1979	151	14	0	14	0.09	100

LONG HARBOUR RIVER River code 3409780

Counting Fence

Fyke Nets

Long Harbour River is located on the south coast of insular Newfoundland (Fig. 1). It flows southeast into the bottom of Fortune Bay over a distance of 418 km. The drainage area is 932.4 km^2.

In the early 1960's Long Harbour River was identified as a potential site for hydroelectric development. Because there was limited knowledge on the fish populations in this system, a project was undertaken by Resource Development Branch in 1966 to gather additional information. The project included the use of fyke nets and a counting fence to enumerate both salmon smolts and adults and smolts were fin clipped for estimation of population size. The fyke traps were installed from 10 May to 18 August and captured 5494 smolts. The mark recapture data estimated total smolt migration to be 114,111 smolts (Riche 1969). Analysis of weight, length and age frequency showed smolts to have a mean weight of 36.5 gm, mean length of 17.5 cm and 84% to be age 3+. Other fish species taken in fyke nets are shown in Table 50.

One adult trap was installed on 22 June and operated until the 18 August. A total of 876 adult salmon were enumerated of which 99% were grilse (Table 50). The adult count was not considered to be complete because of two washouts resulting from high water discharge (Riche 1969). From a sample of 120 adults taken in the recreational fishery, sex ratio of adults was determined to be 75% females.

The recreational fishery in 1966 took 274 grilse and one salmon with an effort of 84 rod days. The CUE was a 3.27 (Table 51).

Table 50. Summary* of fish species captured by fyke nets in Long Harbour River, 1966.

Date	Atlantic salmon			Other species		
	Adults	Smolts	Parr	Brook trout	Smelt	Eels
10 May 15 June		4689	783	343	2647	287
22 June 18 Aug.	876*	805	1579	369	5314	87
Total	876*	5494	2362	712	7961	374

*Partial counts only.

Table 51. Angled catch, effort and catch per unit effort for Atlantic salmon in Long Harbour River, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	112	49	9	58	0.52	84
1954	68	31	2	33	0.49	94
1955	26	8	3	11	0.42	73
1956	64	49	2	51	0.80	96
1957	31	15	2	17	0.55	88
Mean 1953-5	60.2	30.4	3.6	34.0	0.56	89
1958	55	65	3	68	1.24	96
1959	47	61	2	63	1.34	97
1960	29	58	1	59	2.03	98
1961	42	28	0	28	0.67	100
1962	102	129	3	132	1.29	98
Mean 1958-62	55.0	68.2	1.8	70.0	1.27	97
1963	78	182	1	183	2.35	99
1964	255	386	5	391	1.53	99
1965	238	468	0	468	1.97	100
1966	84	274	1	275	3.27	100
1967	264	114	3	117	0.44	97
Mean 1963-67	183.8	284.8	2.0	286.8	1.56	99
1968	246	269	9	278	1.13	97
1969	383	408	1	409	1.07	100
1970	359	391	2	393	1.09	99
1971	221	126	9	135	0.61	93
1972	210	338	1	339	1.61	100
Mean 1968-72	283.8	306.4	4.4	310.8	1.10	99
1973	395	380	0	380	0.96	100
1974	310	120	3	123	0.40	98
1975	346	240	0	240	0.61	00
1976	422	438	7	445	1.05	98
1977	244	242	1	243	1.00	100
Mean 1973-77	343.4	284.0	2.2	286.2	0.83	99
1978	404	396	0	396	0.98	100
1979	180	180	0	180	1.00	100

BAY DU NORD RIVER River code 3410790

Fishway, Counting Fence, Fyke Nets

The Bay du Nord River is located on the south coast of insular Newfoundland (Fig. 1). It flows south into the west side of Fortune Bay and drains an area of 117 km^2.

In 1949, a fishway was blasted at Smokey Falls approximately 14 km from the river mouth. Fishway construction was part of a river improvement program designed to increase salmon production in waters limited by natural barriers to fish migration. The fishway was completed in June 1949, but no Atlantic salmon utilized the facility during that year. In 1950, despite an apparent abundance of salmon in the river, only 12 grilse were recorded at the fishway (Anon. 1949, 1950). Monitoring at the fishway was discontinued after 1950.

In 1952, as part of preliminary investigation of the biology of Atlantic salmon in Newfoundland, fyke nets and a counting fence were installed on the Bay du Nord River. The fyke nets were unsuccessful in capturing a significant number of smolts and were not used after 1953. The counting fence was operated for three years, 1953-55, to monitor both smolt and adult salmon migrations. Data obtained at the fence are presented in Table 52. In addition to enumerating fish migration, an extensive tagging program was conducted at the site, the details of which are available in (Anon. 1953, 1954, 1955). Timing of migrations and angling data for Bay du Nord River are given in Tables 53 and 54.

Table 52. Escapement of Atlantic salmon adults and juveniles through the Bay du Nord River counting fence, 1953-55.

Year	Adults			Juveniles	
	Grilse	Salmon	Kelt	Smolt	Parr
1953	98	53	56	8876	848
1954	21	34	58	8264	1994
1955	23	6	-	-	-

Table 53. Timing of the Atlantic salmon smolts and adult migration through the Bay du Nord River counting fence, 1953-55.

Year	Migration periods					
	First fish recorded		Peak migration		Last fish recorded	
	Smolt	Adult	Smolt	Adult	Smolt	Adult
1953	06 May	20 June	24-30 May	05-11 July	30 June	03 Oct*
1954	07 May	19 June*	16-22 May	03 July*	29 June	07 Aug*
1955	Not available					

*Week ending.

Table 54. Angled catch, effort and catch per unit effort for Atlantic salmon in Bay du Nord River, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	100	17	6	23	0.23	74
1954	11	3	0	3	0.27	100
1955	29	9	3	12	0.41	75
1956	46	7	7	14	0.30	50
1957	67	18	3	21	0.31	86
Mean 1953-57	50.6	10.8	3.8	14.6	0.29	74
1958	73	30	6	36	0.49	83
1959	166	43	20	63	0.38	68
1960	145	22	9	31	0.21	71
1961	133	20	7	27	0.20	74
1962	149	35	7	42	0.28	83
Mean 1958-62	133.2	30.0	9.8	39.8	0.30	75
1963	158	59	16	75	0.47	79
1964	171	37	2	39	0.23	95
1965	48	20	2	22	0.46	91
1966	128	11	4	15	0.12	73
1967	32	23	4	27	0.84	85
Mean 1963-67	107.4	30.0	5.6	35.6	0.33	84
1968	35	38	12	50	1.43	76
1969	26	44	1	45	1.73	98
1970	41	51	0	51	1.24	100
1971	32	46	6	52	1.63	88
1972	28	46	9	55	1.96	84
Mean 1968-72	32.4	45.0	5.6	50.6	1.56	89
1973	45	97	16	113	2.51	86
1974	323	58	4	62	0.19	94
1975	277	52	4	56	0.20	93
1976	265	40	1	41	0.15	98
1977	154	45	0	45	0.29	100
Mean 1973-77	212.8	58.4	5.0	63.4	0.30	92
1978	293	69	2	71	0.21	97
1979	191	34	2	36	0.19	94

SALMON RIVER River code 3614070

Fishway

Salmon River is located on the south coast of insular Newfoundland (Fig. 1). Prior to 1965 it was one of the largest rivers on the island with a drainage area of approximately 2708 km^2 and a main and tributary length totalling 480 km. Since 1965 the system has become a part of the Bay D'Espoir Hydroelectric Power Development and more recently part of the Upper Salmon Hydroelectric Development.

Access for Atlantic salmon to Salmon River was extremely limited even before 1965. The river had a complete obstruction to Atlantic salmon migration at km 2.2 and another at km 5.6. It was thought that at certain water levels access may have been possible at the former. In 1949, in an effort to increase the area available for Atlantic salmon, a fishway was constructed at the lower falls by the Fisheries Research Board of Canada. Following construction in 1949, a counting trap was installed and operated for the month of September. A total of 15 salmon were recorded of which six were large salmon (Anon. 1949).

In 1950, the counting trap was again installed and operated from 25 June to 10 September. A count of 20 grilse and 10 large salmon was obtained which was thought to represent the entire run above the falls. Peak migration was in the week ending 29 July (Anon. 1950).

The counting trap was not reinstalled again until 1960. At that time, the trap was operated from 19 June to 10 September with a total of 26 grilse and 1 large salmon enumerated. An anticapted increase in population as a result of the presence of the fishway did not materialize. Ineffective operation of the fishway was thought to have been the main problem, there was only a small amount of rearing area between the fishway and the next complete obstruction. Peak migration in 1960 occurred during the week ending 30 July (Anon. 1960).

Angling data from Salmon River was collected only intermittently up to 1974. Since 1974, angling effort has averaged only 30 rod days, with the catch ranging between 0 and 21 grilse per season (Table 55).

Table 55. Angled catch, effort and catch per unit effort for Atlantic salmon in Salmon River, 1953-79.*

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	0	0	0	0	0.0	0
1962	8	9	0	9	1.13	100
Mean 1958-62	1.6	1.8	0.0	1.8	1.12	100
1974	53	21	0	21	0.40	100
1975	28	0	0	0	0.0	0
1976	30	6	0	6	0.20	100
1977	10	0	0	0	0.0	0
Mean 1973-77	24.2	5.4	0.0	5.4	0.22	100
1978	12	3	0	3	0.2	100
1979	12	3	0	3	0.2	100

*Data collected intermittently between 1953 and 1974.

WHITE BEAR RIVER — River code 3717440

Counting Fence

White Bear River flows south into White Bear Bay on Newfoundland's south coast (Fig. 1). The river was at one time approximately 54.7 km long with a drainage area of 2046 km^2 but in 1969 approximately 60% of the drainage area was diverted to form part of the water storage for the Bay D'Espoir Power Development.

The system consisted of 21 major tributaries, only one of which was accessible to Atlantic salmon prior to 1972. At that time remedial work between km 19 and km 21.7 on the main stem opened up an additional four tributaries to salmon migration.

In 1973, a counting fence was installed at km 32 to determine the extent of salmon migration above the obstructions. The fence was operated from 20 July to 27 September with a washout occurring from 20 July to 6 August. No salmon were recorded at the site but this was not considered to be conclusive evidence that salmon could not reach the area. Some fish may have moved above the fence during the washout or others may have spawned immediately below the counting fence (Porter and Davis 1974).

Angling data from the White Bear River for 1953-79 are given in Table 56.

Table 56. Angled catch, effort and catch per unit effort for Atlantic salmon in White Bear River, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	49	42	2	44	0.90	95
1954	12	0	3	3	0.25	0
1955	19	14	1	15	0.79	93
1956	11	3	0	3	0.27	100
1957	11	10	5	15	1.36	67
Mean 1953-57	20.4	13.8	2.2	16.0	0.78	86
1958	24	14	3	17	0.71	82
1959	98	40	0	40	0.41	100
1960	77	21	8	29	0.38	72
1961	133	58	11	69	0.52	84
1962	167	151	11	162	0.97	93
Mean 1958-62	99.8	56.8	6.6	63.4	0.64	90
1963	167	106	16	122	0.73	87
1964	150	91	8	99	0.66	92
1965	127	67	3	70	0.55	96
1966	144	135	8	143	0.99	94
1967	143	49	6	55	0.38	89
Mean 1963-67	146.2	89.6	8.2	97.8	0.67	92
1968	106	71	1	72	0.68	99
1969	129	69	7	76	0.59	91
1970	66	34	2	36	0.55	94
1971	130	46	1	47	0.36	98
1972	140	141	5	146	1.04	97
Mean 1968-72	114.2	72.2	3.2	75.4	0.66	96
1973	203	158	3	161	0.79	98
1974	303	201	1	202	0.67	100
1975	304	217	2	219	0.72	99
1976	359	202	2	204	0.57	99
1977	336	84	5	89	0.26	94
Mean 1973-77	301.0	172.4	2.6	175.0	0.58	99
1978	184	80	2	82	0.32	98
1979	161	76	1	77	0.48	99

LITTLE CODROY RIVER River code 4000140

Counting Fence

Background information on fence design is available in Murray (1968), analysis of data on the biology of Atlantic salmon on Little Codroy River has been completed by Murray (1968). This report presents data summaries of salmon migrations at the fence (Table 57) and angling data for the years 1953-79 (Table 58). The history and purpose of the Little Codroy River facility has been summarized by Blair and Murray in the Report of the Newfoundland Fisheries Research Station for 1953, and is as follows:

> "Decline of the Atlantic salmon fishery in eastern Canada has provided stimulus for expansion of research in an attempt to improve management practices. To provide data for proper adjustment of the fishery regulations, a long term research project is being set up on the Little Codroy River in Newfoundland and will begin operation during the spring of 1954.
>
> The purpose of the project is to provide information on the effects of the physical, chemical and biological factors of the freshwater environment of the salmon in an attempt to assess the causes of natural fluctuations in their abundance."

The adults, kelts and smolts were enumerated from 1954 to 1963.

Table 57. Escapement of Atlantic salmon adults, juveniles and brook trout through the Little Codroy River counting fence, 1954-63 (Murray 1968).

	Adults			Juveniles	Brook trout	
Year	Grilse	Salmon*	Kelt	Smolt	Upstream	Downstream
1954	139	80	253	12210		
1955	95	35	84	11248	441	
1956	67	42	108	14771	323	706
1957	117	49	71	8900	219	1067
1958	84	55	16	9341	224	889
1959	83	50	65	12099	644	1074
1960	45	33	34	7850	397	457
1961	26	33	16	8232	349	312
1962	39	35	34	8190	85	698
1963	118	41	24	7236	232	485

*Includes 2 and 3 sea winter salmon.

Table 58. Angled catch, effort and catch per unit effort for Atlantic salmon in Little Codroy River, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	175	17	79	96	0.50	18
1954	93	14	25	39	0.42	36
1955	140	6	4	10	0.07	60
1956	101	2	6	8	0.08	25
1957	38	4	4	8	0.21	50
Mean 1953-57	109.4	8.6	23.6	32.2	0.29	27
1958	57	3	9	12	0.21	25
1959	162	3	2	5	0.03	60
1960	111	1	0	1	0.01	100
1961	16	1	1	2	0.13	50
1962	76	6	1	7	0.09	86
Mean 1958-62	84.4	2.8	2.6	5.4	0.06	52
1963	141	7	4	11	0.08	64
1964	323	9	12	21	0.07	43
1965	155	20	25	45	0.29	44
1966	197	19	10	29	0.15	66
1967	218	30	6	36	0.17	83
Mean 1963-67	206.8	17.0	11.4	28.4	0.14	60
1968	150	50	0	50	0.33	100
1969	255	10	8	18	0.07	56
1970	381	42	11	53	0.14	79
1971	318	31	11	42	0.13	74
1972	451	38	28	66	0.15	58
Mean 1968-72	311.0	34.2	11.6	45.8	0.15	75
1973	531	35	32	67	0.13	52
1974	316	43	13	56	0.18	77
1975	221	46	16	62	0.28	74
1976	522	126	50	176	0.34	72
1977	494	95	40	135	0.27	70
Mean 1973-77	416.8	69.0	30.2	99.2	0.24	70
1978*	273	29	10	39	0.14	74
1979*	336	83	2	85	0.25	98

*Fishing season reduced from 24 May-15 Sept to 1 July-31 August.

HARRYS RIVER — River code 4101200

Counting Fence

Harry's River is located on the west coast of Newfoundland near the town of Stephenville (Fig. 1). It flows for a distance of 35 km and drains approximately 815 km^2 before flowing into St. George's Bay.

In 1966, a proposed industrial development for Stephenville included diversion and utilization of water from Harry's River for domestic and industrial purposes. As part of a preliminary assessment of the environmental impact, enumeration of the Atlantic salmon population was conducted during the summer of 1967. A counting fence was installed at km 4.4 and operated from 22 June to 2 September. Unfortunately, high water discharge washed out the structure on two occasions and a complete count could not be obtained (Anon. 1968; Downer 1968).

During the operation period a total of 1245 salmon were recorded, of which 266 were considered to be large salmon. Peak migration occurred during the week of 15 July. Angling data for the same period shows an effort of 2630 rod days, 954 fish being angled. Some 248 of these were large salmon (Table 59).

Fortunately, an alternate water supply was found for the industrial development, and Harrys River remains unaltered.

Table 59. Angled catch, effort and catch per unit effort for Atlantic salmon in Harrys River, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	3458	935	146	1081	0.31	86
1954	800	244	18	262	0.33	93
1955	1464	499	61	560	0.38	89
1956	2211	668	206	874	0.40	76
1957	1689	1418	493	1911	1.13	74
Mean 1953-57	1924.4	752.8	184.8	937.6	0.49	80
1958	537	984	218	1202	2.24	82
1959	1466	604	95	699	0.48	86
1960	302	603	91	694	2.30	87
1961	1676	734	119	853	0.51	86
1962	3316	1488	226	1714	0.52	87
Mean 1958-6	1459.4	882.6	149.8	1032.4	0.71	85
1963	4354	2467	457	2924	0.67	84
1964	3933	2673	373	3046	0.77	88
1965	3338	1175	262	1437	0.43	82
1966	2113	620	316	936	0.44	66
1967	2630	706	248	954	0.36	74
Mean 1963-67	3273.6	1528.2	331.2	1859.4	0.57	82
1968	2640	863	85	948	0.36	91
1969	3360	1491	181	1672	0.50	89
1970	5288	1662	207	1869	0.35	89
1971	5146	1435	47	1482	0.29	97
1972	3632	782	32	814	0.22	96
Mean 1968-72	4013.2	1246.6	110.4	1357.0	0.34	92
1973	4748	1583	196	1779	0.37	89
1974	4218	941	34	975	0.23	97
1975	2180	704	16	720	0.33	98
1976	2893	902	40	942	0.33	96
1977	3853	1008	68	1076	0.28	94
Mean 1973-77	3578.4	1027.6	70.8	1098.4	0.31	94
1978*	3142	713	65	778	0.25	92
1979*	755	148	1	149	0.20	99

*Fishing season reduced from 24 May-15 September to 1 July-31 August.

HUMBER RIVER River code 4402430

Counting Fence

The Humber River is located on the west coast of insular Newfoundland and flows southwest into the Bay of Islands. The Humber River is the second largest river on the island (Exploits River is the largest) and drains an area of 7540 km^2. The system is accessible to Atlantic salmon to km 99 were Main Falls, a 15 metre high obstruction, blocks further migration. Because the area above Main Falls represents approximately one third of the drainage area, a fishway has been considered for the site. As part of a preliminary survey for fishway construction, a counting fence was installed in 1967 approximately 16 km below Main Falls. The intent was to determine the size of Atlantic salmon migration to the falls and in turn assess the potential for natural stocking through straying should a fishway be constructed.

The counting fence was operated from 8 July to 16 September with a total of 144 grilse and 16 large salmon recorded. Peak migration occurred between 20 August and 2 September but may have been delayed by low water levels (Anon. 1968).

Despite several engineering surveys and biological assessments since 1967 (Anderson 1974, unpublished data) a fishway has yet to be constructed at Main Falls.

In 1966, as part of an enhancement program on the Exploits River (Mercer 1974; Porter et al. 1974; Farwell 1975; Farwell and Porter 1976; Moores 1978), the Humber River was assessed for its potential as a donor stream for salmon. It was determined that between 501 to 700 adult salmon could be removed per year without any detrimental effects to the existing population. Adies Stream, a major tributary of the Humber River (Fig. 1), was chosen as the collection site and, in 1967, a counting fence was installed. The counting fence was operated for six years primarily as a means of collecting fish for the transfer to the Exploits River (Anon. 1968-69, Riche and Traverse 1970, 1971; Traverse 1972, 1973). Records of fish numbers moving through the fence were also kept after 1968 but none of the counts represented the entire salmon run to Adies Stream (Table 58). The numbers of salmon transferred to the Exploits River are also given in Table 60. Angling data for the Humber River are shown in Table 61.

Table 60. Numbers of Atlantic salmon enumerated at Adies Stream, Humber River and numbers transferred to the Exploits River. Numbers in parenthesis indicate transfer mortalities.

	Escapement*			Numbers transferred		
Year	Grilse	Salmon	Total	Grilse	Salmon	Total
1966	1740	151	1891	-	-	-
1967	668	53	721	222	3	225
1968	1949	113	2062	358	7	365
1969	4299	198	4497	433	3	456 (23)
1970	1705	44	1749	391	2	520 (127)
1971	2770	76	2846	505	3	508
1972	1540	117	1657	500	7	508 (1)
1973	1506	209	1715	-	-	-

*Partial records only.

Table 61. Angled catch, effort and catch per unit effort for Atlantic salmon in Humber River, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	3715	1260	149	1409	0.38	89
1954	4161	876	137	1013	0.24	86
1955	2177	1376	138	1514	0.70	91
1956	6953	1076	110	1186	0.17	91
1957	2637	1778	89	1867	0.71	95
Mean 1953-57	3928.	1273.2	124.	1397.8	0.36	91
1958	3350	1686	194	1880	0.56	90
1959	3681	1996	187	2183	0.59	91
1960	3511	1938	178	2116	0.60	92
1961	3639	1867	134	2001	0.55	93
1962	4017	2390	108	2498	0.62	96
Mean 1968-62	3639.6	1975.4	160.2	2135.6	0.59	92
1963	5348	3898	160	4058	0.76	96
1964	7222	4681	268	4949	0.69	95
1965	6551	3951	193	4144	0.63	95
1966	8842	3989	322	4311	0.89	93
1967	5317	2252	160	2412	0.45	93
Mean 1963-67	6656.0	3754.2	220.6	3974.8	0.60	94
1968	5104	2168	96	2264	0.44	96
1969	9690	4459	478	4937	0.51	90
19701	1785	2785	526	3311	0.28	84
1971	9027	3949	375	4324	0.48	91
1972	9413	3961	219	4180	0.44	95
Mean 1968-7	9003.8	3464.4	338.8	3803.2	0.42	91
1973	9612	3411	304	3715	0.39	92
1974	8976	2742	107	2849	0.32	96
1975	9611	6147	114	6261	0.65	98
1976	10489	5102	61	5163	0.49	99
1977	6127	2158	45	2203	0.36	98
Mean 1973-77	8963.0	3912.0	126.2	4038.2	0.45	97
1978	7633	2722	187	2909	0.38	94
1979	7961	3343	27	3370	0.42	99

LOMOND RIVER River code 4503920

Fishway

Background information on fishway design and operations on Lomond River (Fig. 1) prior to 1977 are presented in Anon. (1949), Anon. (1962-1965), Peet (1966), Anon. (1967-1969), Riche and Traverse (1970, 1971) Traverse (1972, 1973) Porter and Davis (1974), Pepper et al. (1975), and Moores (1978).

In 1977, the Lomond River fishway was operated from 26 June to 17 September. A total of 203 Atlantic salmon were enumerated of which 11 were large salmon (Table 62). The first migrant was recorded on 1 July and the last fish was counted when the facility was closed on 17 September. Peak migration was during a two week period 10-23 July (Table 63). There were no problems experienced at the fishway in 1977 although some minor leaks have developed in the lower pools. The attendant also reported some fish were reluctant to enter the fishway and indicated that a few may have successsfully surmounted the falls.

Operation in 1978 was from 25 June to 28 September. There were 129 Atlantic salmon recorded of which 12 were large salmon (Table 62). The first fish was enumerated on 27 June and the last on 28 August. Peak migration was from 22-29 July (Table 63). There were no major operational difficulties in 1978 although low water discharge during September did reduce the efficiency of the facility. A diversion dam is required at the exit to permanently solve this discharge problem. It was again noted in 1978 that salmon were reluctant to enter the fishway and particularly the counting trap.

Fishway operations in 1979 were contracted to SAEN. They operated the facility from 19 June to 07 September and recorded a total migration of 195 grilse and one large salmon (Table 62). The first migrant was recorded on 11 July and the last on 28 August. Peak migration was from 21-28 July (Table 63). Again in 1979 there were no major problems at the facility. Plans for installation of a diversion dam and new counting trap had to be postponed until 1980. Metal grating was installed over the the fishway in 1979 to prevent any future poaching problems.

Migration of Atlantic salmon through the Lomond River fishway has shown considerable improvement over the last four years (Table 64). Although some increase in escapement of Atlantic salmon to Lomond River may have occurred, the increase through the fishway is mainly attributible to careful attention given to fishway operation by the counting trap attendants.

The recreational fishery on Lomond River in 1977, 1978 and 1979 took 529, 374 and 237 Atlantic salmon, respectively. These catches are comparable to previous years despite the extremely poor fishing conditions caused by low water levels (Table 65).

Table 62. Weekly escapement of Atlantic salmon and other fishes through the Lomond River fishway, 1977-79.

Week (ending)	1977 Escapement: Atlantic salmon Grilse	Salmon	Total	Brook trout Resident	Sea run	Mean water* temp (°C)	Mean water* height (cm)
02-07-77	2	0	2	0	0	-	-
09-07-77	1	0	1	0	0	-	-
16-07-77	38	6	44	0	20	-	-
23-07-77	35	3	38	0	0	-	-
30-07-77	17	0	17	0	0	-	-
06-08-77	18	0	18	0	0	-	-
13-08-77	13	1	14	0	37	-	-
20-08-77	8	0	8	0	46	-	-
27-08-77	16	0	16	0	27	-	-
03-09-77	7	0	7	0	17	-	-
10-09-77	20	1	21	0	0	-	-
17-09-77	17	0	17	0	0	-	-
Total	192	11	203	0	147	-	-

Table 62 (cont'd).

Week (ending)	1978 Escapement: Atlantic salmon Grilse	Salmon	Total	Brook trout Resident	Sea run	Mean water temp (°C)	Mean water* height (cm)
01-07-78	10	3	13	0	1	15.9	-
08-07-78	12	3	15	3	0	14.0	-
15-07-78	15	4	19	0	1	17.9	-
22-07-78	32	1	33	0	3	16.5	-
29-07-78	36	1	37	0	1	14.6	-
05-08-78	6	0	6	0	4	15.5	-
12-08-78	1	0	1	0	0	16.7	-
19-08-78	3	0	3	0	0	14.8	-
26-08-78	1	0	1	0	0	17.8	-
02-09-78	1	0	1	0	0	-	-
09-09-78	0	0	0	0	0	13.0	-
16-09-78	0	0	0	0	0	11.6	-
23-09-78	0	0	0	0	0	10.4	-
30-09-78	0	0	0	0	0	10.2	-
Total	117	12	129	3	10		-

*No record.

Table 62 (cont'd)

Week (ending)	1979 Escapement						Mean water temp (°C)	Mean water* height (cm)
	Atlantic salmon			Brook trout		Eels		
	Grilse	Salmon	Total	Resident	Sea run			
23-06-79	0	0	0	0	0	0	18.4	-
30-06-79	0	0	0	0	0	0	15.9	-
07-07-79	0	0	0	0	0	0	17.1	-
14-07-79	8	0	8	0	0	0	16.4	-
21-07-79	92	1	93	0	11	0	16.3	-
28-07-79	41	0	41	0	20	0	18.3	-
04-08-79	26	0	26	0	1	1	19.0	-
11-08-79	20	0	20	0	1	0	18.3	-
18-08-79	6	0	6	0	0	0	15.0	-
25-08-79	1	0	1	0	0	0	14.9	-
01-09-79	1	0	1	0	0	0	15.0	-
08-09-79	0	0	0	0	0	0	14.5	-
Total	195	1	196	0	33	1		

*No record.

Table 63. Timing of the Atlantic salmon migration at the Lomond River fishway, 1961-68, 1971-79.

Year	First adult recorded	Peak migration	Last adult recorded	Period of operation
1961	08 July	-	27 Sept.	15 June - 03 Nov.
1962	08 Aug.	05 Aug. - 11 Aug.	24 Aug.	10 June - 29 Sept.
1963	20 July	18 Aug. - 24 Aug.	14 Sept.	02 June - 14 Sept.
1964	01 July	-	23 Sept.	14 June - 05 Oct.
1965	15 July	18 July - 24 July	21 Aug.	04 July - 28 Sept.
1966	10 July	-	10 July	07 July - 03 Sept.
1967++	-	-	-	02 July - 16 Sept.
1968	14 July	-	17 Sept.	02 June - 28 Sept.
1969++	-	-	-	-
1970	-	-	-	No operation
1971	16 July	08 Aug. - 14 Aug.	03 Sept.	20 June - 18 Sept.
1972	15 July	23 July - 29 July	29 Aug.	07 July - 16 Sept.
1973	16 July	16 July - 21 July	06 Sept.	15 July - 08 Sept.
1974	06 July	21 July - 27 July	07 Sept.	30 June - 07 Sept.
1975	16 July	-	16 July	01 June - 16 Aug.
1976	26 June	08 Aug. - 14 Aug.	21 Aug.	06 June - 28 Aug.
1977	01 July	10 July - 23 July	17 Sept.	26 June - 17 Sept.
1978	27 June	22 July - 29 July	28 Aug.	25 June - 28 Sept.
1979	11 July	21 July - 28 July	28 Aug.	19 June - 07 Sept.

++No fish recorded.

Table 64. Escapement of Atlantic salmon and other fishes through the Lomond River fishway, 1948-49 and 1961-79.

	Atlantic salmon				Brook trout			
Year	Grilse	Salmon	Total	% Grilse	Resident	Sea run	Eels	Smelt
1948	4	0	4	100	-	-	-	-
1949	2	0	2	100	-	-	-	-
1950-60*	-	-	-	-	-	-	-	-
1961+	10	2	12	83	-	-	-	-
1962	44	5	49	90	-	-	-	-
1963	28	3	31	90	-	8	-	-
1964	25	1	26	96	-	-	-	-
1965	18	4	22	82	-	-	-	-
1966	1	1	2	50	-	-	-	-
1967++	0	0	0	0	-	-	-	-
1968	4	1	5	80	-	-	-	-
1969++	0	0	0	0	-	-	-	-
1970*	-	-	-	-	-	-	-	-
1971	6	0	6	100	-	-	-	-
1972	31	14	45	69	0	21	0	0
1973	108	110	218	50	0	60	16	0
1974	41	33	74	55	0	14	1	24
1975	1	0	1	100	0	0	0	0
1976	133	11	144	92	0	45	0	0
1977	192	11	203	95	0	147	0	0
1978	117	12	129	91	3	10	0	0
1979	195	1	196	99	0	33	1	0

+Partial count.
++No fish recorded, fishway design problem rectified in 1970.
*No count obtained.

NOTE: Angling occurred above and below fishway.

Table 65. Angled catch, effort and catch per unit effort of Atlantic salmon, Lomond River, 1952-79.

Year	Effort (rod days)	Catch			CUE	% grilse
		Grilse	Salmon	Total		
1952	545	194	44	238	0.44	82
1953	359	93	22	115	0.32	81
1954	423	81	27	108	0.26	75
1955	448	113	12	125	0.28	90
1956	306	130	28	158	0.52	82
Mean 1952-56	416	122	27	149	0.36	82
1957	254	116	14	130	0.51	89
1958	359	144	32	176	0.49	82
1959	419	196	65	261	0.62	75
1960	503	124	28	152	0.30	82
1961	403	160	33	193	0.48	83
Mean 1957-61	388	148	34	182	0.47	81
1962	778	201	32	233	0.30	86
1963	811	320	32	352	0.43	91
1964	971	349	24	373	0.38	94
1965	170	292	50	342	2.01	85
1966	347	229	61	290	0.84	79
Mean 1962-66	615	278	40	318	0.52	87
1967	568	217	21	238	0.42	91
1968	454	202	3	205	0.45	99
1969	391	147	5	152	0.39	97
1970	457	145	29	174	0.38	83
1971	217	54	1	55	0.25	98
Mean 1967-71	417	153	12	165	0.40	93
1972	1648	253	35	288	0.17	88
1973	1232	286	55	341	0.28	84
1974	1331	324	19	343	0.26	94
1975	773	258	20	278	0.36	93
1976	2054	650	25	675	0.33	96
Mean 1972-76	1408	354	31	385	0.27	92
1977	1461	495	34	529	0.36	94
1978	1267	345	29	374	0.30	92
1979	900	235	2	237	0.26	99

TORRENT RIVER River code 4704800

Fishway

Background information on the Torrent River fishway (Fig. 1) prior to 1977 is available in Anon. (1967-1969), Riche and Traverse (1970, 1971), Traverse (1972, 1973), Porter and Davis (1974), Pepper et al. (1975), and Moores (1978). Details of fishway design are given by Porter and Davis (1974).

Torrent River was the site of an Atlantic salmon enhancement program from 1972 to 1976. Over the five year period adult salmon from Western Arm Brook were transferred to the Torrent River system in order to augment a limited natural run through the fishway (Table 66). The intent was to populate the stream area above the fishway at a faster rate than was occurring through straying from the indigneous salmon population below the fishway. The success or otherwise of this program was to be determined by the size of the migration at the fishway from 1977 to the present (Table 66).

The 1977 migration suggested that the transfer of brood stock has been successful. The 822 adults (789 grilse and 33 large salmon) recorded in 1977 were a considerable increase over previous years. The 1978 count was 23% greater than 1977; it included 968 grilse and 21 large salmon (Table 67). In 1979, the salmon migration was more than double the two previous years. This was higher than anticipated and can only be partially related to the enhancement program. It is possible that introduction of new regulations restricting the use of herring and mackerel nets may also have accounted for the increased river escapement. The 1979 migration was comprised of 1984 grilse and 39 large salmon (Table 67).

During the years 1977-79 there were no major problems with the operation of the Torrent River fishway. Full time attendants have been employed at the facility (under contract to SAEN in 1979) and, with the exception of a new counting trap installed in 1978, no major repairs have been necessary.

Timing of the annual migraton did not differ greatly over the three years although peak migration had occurred as late as August prior to 1977 (Table 68).

In an effort to ensure that sufficient adults migrated above the fishway to adequately stock the area, the sport fishery was closed in 1977 and opened in 1978-79 only after sufficient number of spawners had moved upstream (Table 69).

From 1973 to 1976, a counting fence was installed on Main Parts Brook, a tributary of Torrent River to monitor downstream migration of any transferred salmon and upstream migration of salmon which migrated through the fishway into this tributary. From 1972 to 1975, it was located 1.6 km upstream; in 1976 it was relocated to the mouth of the tributary and adapted to enumerate smolts and kelts as well as upstream migrating adults (Moores 1978). The data collected at the site are presented in Table 70.

Table 66. Escapement of Atlantic salmon and other fishes through the Torrent River fishway, 1966-79, including fish transferred from Western Arm Brook.

	Atlantic salmon					Brook trout			
Year	Grilse	Salmon	Total	% Grilse	Numbers* transferred	Resident	Sea run	Eels	Smelt
1966	40	0	40	100	-	9	5	0	0
1967	49	2	51	96	-	0	10	0	0
1968	29	1	30	97	-	18	9	1	0
1969	18	5	23	78	-	15	4	0	0
1970	36	2	38	95	-	40	1	0	0
1971	51	4	55	93	-	100	20	0	0
1972	57	3	60	95	56	55	0	7	0
1973	95	12	107	89	203	104	8	0	0
1974	38	3	41	93	83	94	0	0	0
1975	191	25	216	88	223(10)+	0	0	0	0
1976	341	47	388	88	100	88	11	0	37
1977	789	33	822	96	-	0	16	0	0
1978	968	21	989	98	-	16	5	-	-
1979	1984	39	2023	98	-	34	8	0	0

*All fish transferred were grilse.
+Mortalities.

NOTE: 1978 and 1979 angling occurred below fishway.
1976 and 1977 angling prohibited.
Previous years angling occurred above and below fishway.

Table 67. Weekly escapement of Atlantic salmon and other fishes through the Torrent River fishway, 1977-79.

Week (ending)	1977 Escapement: Atlantic salmon Grilse	Salmon	Total	Brook trout Resident	Sea run	Mean water temp (°C)	Mean water height (cm)
02-07-77	2	0	2	0	0	-	-
09-07-77	64	6	70	0	5	14.2	111.6
16-07-77	127	13	140	0	4	14.8	100.8
23-07-77	208	7	215	0	4	16.1	99.6
30-07-77	167	4	171	0	1	14.4	110.6
06-08-77	93	3	96	0	2	14.4	114.6
13-08-77	56	0	56	0	0	14.3	102.0
20-08-77	23	0	23	0	0	14.7	84.9
27-08-77	12	0	12	0	0	15.2	75.0
03-09-77	28	0	28	0	0	15.0	84.8
10-09-77	5	0	5	0	0	13.3	82.0
17-09-77	1	0	1	0	0	12.0	84.0
24-09-77	2	0	2	0	0	11.5	105.0
01-10-77	1	0	1	0	0	10.3	117.0
Total	789	33	822	0	16		

Table 67. (cont'd)

Week (ending)	1978 Escapement: Atlantic salmon Grilse	Salmon	Total	Brook trout Resident	Sea run	Mean water* temp (°C)	Mean water* height (cm)
08-07-78	55	4	59	3	0		
15-07-78	204	7	211	1	0		
22-07-78	193	5	198	0	1		
29-07-78	168	4	172	2	0		
05-08-78	163	1	164	1	2		
12-08-78	91	0	91	0	0		
19-08-78	37	0	37	5	0		
26-08-78	13	0	13	0	0		
02-09-78	13	0	13	0	0		
09-09-78	19	0	19	1	2		
16-09-78	3	0	3	0	0		
23-09-78	1	0	1	0	0		
30-09-78	0	0	0	2	0		
07-10-78	4	0	4	0	0		
14-10-78	3	0	3	1	0		
21-10-78	1	0	1	0	0		
Total	968	21	989	16	5		

*Data not available

Table 67. (cont'd)

Week (ending)	1979 Escapement					Mean water temp (°C)	Mean water height (cm)
	Atlantic salmon			Brook trout			
	Grilse	Salmon	Total	Resident	Sea run		
30-06-79	49	5	54	5	0	15.0	90.0
07-07-79	179	4	183	5	0	15.7	92.8
14-07-79	429	14	443	1	1	16.1	101.1
21-07-79	459	6	465	3	0	16.7	103.9
28-07-79	330	1	331	5	1	18.4	108.6
04-08-79	254	9	263	3	0	18.9	120.2
11-08-79	113	0	113	2	0	17.4	114.4
18-08-79	91	0	91	1	0	16.0	107.4
25-08-79	58	0	58	4	0	16.1	119.6
01-09-79	9	0	9	0	0	17.3	100.7
08-09-79	7	0	7	3	0	15.9	95.6
15-09-79	4	0	4	2	5	15.3	131.6
22-09-79	2	0	2	0	0	14.0	144.4
29-09-79	0	0	0	0	0	12.0	107.6
06-10-79	0	0	0	0	1	10.3	109.0
13-10-79	0	0	0	0	0	9.3	93.0
20-10-79	0	0	0	0	0	7.7	88.0
27-10-79	0	0	0	0	0	7.0	109.0
03-11-79	0	0	0	0	0	5.5	109.5
Total	1984	39	2023	34	8		

Table 68. Timing of the Atlantic salmon migration at the Torrent River fishway, 1966-79.

Year	First adult recorded	Peak migration	Last adult recorded	Period of operation
1966	27 July	31 July - 06 Aug.	07 Sept.	23 July - 05 Nov.
1967	18 July	06 Aug. - 12 Aug.	22 Sept.	17 June - 23 Sept.
1968	14 July	21 July - 27 July	07 Oct.	15 June - 12 Oct.
1969	14 July	20 July - 26 Jly	30 Aug.	09 June - 29 Sept.
1970	23 July	09 Aug. - 15 Aug.	26 Oct.	20 June - 19 Nov.
1971	09 July	18 July - 24 July	24 Sept.	29 May - 23 Oct.
1972	20 July	30 July - 05 Aug.	28 Sept.	04 June - 11 Nov.
1973	13 July	15 July - 21 July	29 Oct.	17 June - 04 Nov.
1974	10 July	25 Aug. - 31 Aug.	23 Sept.	02 June - 16 Nov.
1975	06 July	27 July - 02 Aug.	11 Oct.	31 May - 11 Oct.
1976	06 July	11 July - 17 July	16 Oct.	27 June - 23 Oct.
1977	01 July	17 July - 23 July	26 Sept.	26 June - 01 Oct.
1978				
1979	30 June	14 July - 21 July	18 Sept.	30 June - 03 Nov.

Table 69. Angled catch, effort and catch per unit effort for Atlantic salmon, Torrent River, 1952-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1952	97	12	6	18	0.19	66
1953	169	4	9	13	0.08	31
1954	187	15	3	18	0.10	83
1955	184	22	15	37	0.20	59
1956	464	51	29	80	0.17	64
Mean 1952-56	220	21	12	33	0.15	76
1957	377	73	21	94	0.25	78
1958	594	24	34	58	0.10	41
1959	585	31	54	85	0.15	36
1960	401	54	32	86	0.21	63
1961	569	37	43	80	0.14	46
Mean 1957-61	505	44	37	81	0.16	54
1962	893	107	37	144	0.16	74
1963	1286	107	64	171	0.13	63
1964	593	66	40	106	0.18	62
1965	455	62	36	98	0.22	63
1966	794	43	13	56	0.07	77
Mean 1962-66	804	77	38	115	0.14	67
1967	598	36	11	47	0.08	77
1968	998	70	7	77	0.08	91
1969	315	41	4	45	0.14	91
1970	277	52	9	61	0.22	85
1971	333	53	5	58	0.17	91
Mean 1967-71	494	50	7	57	0.12	88
1972	306	22	3	25	0.08	88
1973	413	88	3	91	0.22	97
1974	400	58	4	62	0.15	94
1975	364	123	6	129	0.35	95
1976*	-	-	-	-	-	-
Mean 1972-75	371	73	4	77	0.21	95
1977*	-	-	-	-	-	-
1978**	183	31	4	35	0.19	89
1979**	238	65	3	68	0.29	96

* Angling prohibited.
** Partial season only

Table 70. Fish enumerated at the Main Parts Brook counting fence, 1973-76.

Year	Period of Operation	Smolt Fence				Adult Fence		
		Smolt	Parr	Trout	Eels	Grilse	Trout	Eels
1973	July 15 - October 26	NC	NC	NC	NC	0	0	0
1974	July 15 - August 27*	NC	NC	NC	NC	0	1	0
1975	May 29 - July 17	16	23	92	4			
	July 17 - September 23					3	0	0
1976	May 28 - July 6	124	17	26	16			
	July 7 - September 23					2	0	0
1977	June 1 - June 6**							

*High water, fence not operating (July 23-25).
**Fence damaged by heavy logs, was not reinstalled.
NC-No counts.

EAST RIVER

River code 4704840

Counting Fence

East River, or Big East River as it is known locally is located on the Great Northern Peninsula on Newfoundland's west coast (Fig. 1). It flows into Hawkes Bay just north of the Torrent River. In 1971, a counting fence was installed on East River to assess whether or not there was sufficient Atlantic salmon to be used as brood stock on Torrent River (see Torrent River, p. 95).

The counting fence was installed on 27 June and operated until 3 August. Unfortunately, fluctuations in water discharge in the system were such that the fence was washed out on 28 June and again on 3 August. Despite an indication from angling data (Table 71) of sufficient salmon to permit a transfer to Torrent River, the fence was not reinstalled after 3 August due to the unfavourable conditions. A partial count of 68 grilse and 19 large salmon was obtained during the brief operating period (Traverse 1972).

Table 71. Angled catch, effort and catch per unit effort for Atlantic salmon in East River, 1953-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1953	394	180	36	216	0.55	83
1954	488	221	39	260	0.53	85
1955	223	101	16	117	0.52	86
1956	219	118	4	122	0.56	97
1957	188	109	23	132	0.70	83
Mean 1953-57	302.4	145.8	23.6	169.4	0.56	86
1958	259	220	43	263	1.02	84
1959	438	97	26	123	0.28	79
1960	389	159	26	185	0.48	86
1961	1462	167	50	217	0.15	77
1962	1304	153	13	166	0.13	92
Mean 1958-62	770.4	159.2	31.6	190.8	0.25	83
1963	878	190	21	211	0.24	90
1964	725	226	32	258	0.36	88
1965	793	279	31	310	0.39	90
1966	785	219	31	250	0.32	88
1967	1005	192	21	213	0.21	90
Mean 1963-67	837.2	221.2	27.2	248.4	0.30	89
1968	1005	174	15	189	0.19	92
1969	829	186	8	194	0.23	96
1970	516	175	12	187	0.36	94
1971	754	90	26	116	0.15	78
1972	663	136	6	142	0.21	96
Mean 1968-72	753.4	152.2	13.4	165.6	0.22	92
1973	858	172	15	187	0.22	92
1974	911	78	15	93	0.10	84
1975	602	70	3	73	0.12	96
1976	870	134	12	146	0.17	92
1977	1321	223	34	257	0.19	87
Mean 1973-77	912.4	135.4	15.8	151.2	0.17	90
1978	1084	144	10	154	0.14	94
1979	1186	410	4	414	0.35	99

WESTERN ARM BROOK River code 4905190

Counting Fence

In 1971, as part of the Torrent River Atlantic salmon enhancement program (see p. 95), a temporary counting fence was installed on Western Arm Brook. Its main function from 1971 to 1976 was the collecton of adult salmon for transfer to Torrent River (Traverse 1973; Riche 1973; Traverse 1973, Porter and Davis 1974; Pepper et al. 1975; Moores 1978). Subsequent to 1977, the fence was operated primarily to collect additional data on the Atlantic salmon population (Chadwick et al. 1978; Chadwick 1981).

In 1977, the fence was operated from 29 May to 23 October. The smolt count during this period was 9640 with 298 kelts also recorded moving downstream (Table 72). The first smolt was recorded on 3 June, the migration peaked between 11 June and 18 June and the last smolt was recorded on 5 July. Other fishes recorded during the operating period included 358 Atlantic salmon parr, 373 brook trout, 65 American eels, 354 American smelt, 12 American shad, and 26 three-spined sticklebacks.

The 1977 adult upstream migration began on 25 June, peaked during the week of 10-16 July and terminated on the 23 September (Table 73). During the period a total of 362 grilse and three large salmon were recorded (Table 74). There were no major problems with fence operations in 1977 but in the early part of the season, there was some mortality at the counting fence of adults which had been tagged in St. Barbe Bay.

In 1978, the fence was in operation from 27 May to 30 October. During that period a record migration of 13071 smolts were recorded (Table 72). The first smolt was recorded on 28 May, the migration peaked from 13-19 June and the last smolt during the spring migration was on July 14 (Table 73). A smolt trap which was installed in September recorded 28 juvenile salmon, of the size and appearance of smolts, migrating downstream.

Kelts moving downstream in the spring migration totalled 210 (Table 72). Other fishes enumerated included 899 Atlantic salmon parr, 1000 brook trout, 69 American eels, 527 American smelt, 22 three-spined sticklebacks, and two American shad.

In 1978, only 293 grilse and one large salmon were recorded at Western Arm Brook (Table 74). This was the lowest count on record and it was thought to be the result of a poor sea survival of smolt due to adverse environmental conditions. The first fish was released on 30 June and the last on 17 September. Peak migration occurred during the period 15-22 July (Table 73). There were no mortalities among adults at the fence in 1978.

In 1979, the smolt count was not complete but the total number of migrants was estimated to be 9400. The smolt migration was in progress at the time of fence installation and 520 smolts were enumerated on the first day of fence operation. The actual count of 8340 smolts was adjusted using a comparison to migrations in previous years (Chadwick 1981). Peak smolt migration in 1979 was

on 27 May and the last smolt was observed on 03 July. In addition, 235 Atlantic salmon parr, one American eel, 53 American smelt and 21 three-spined sticklebacks were recorded at the fence. All kelt were believed to have moved out of the river before fence installation.

The adult migration in 1979 totalled 1578 fish. This was the highest number ever observed at the fence. All migrants were grilse (Table 74). The last fish was counted on 14 September (Table 73). No mortalities occurred at the fence in 1979.

The sport fishery on Western Arm Brook has been partly restricted since the system has been utilized in the enhancement program on Torrent River. Angled catch declined to only 11 and 23 fish in 1977 and 1978. In 1979, the sport fishery was open only for a few days because of low water levels (Table 75).

Table 72. Counts of Atlantic salmon (adults and smolts), and other fish at the Western Arm Brook counting fence, 1971-79.

	Downstream Migration									Upstream Migration								Transfers to Torrent River	
	Atlantic salmon			Brook trout						Atlantic salmon			Brook trout						
Year	Smolt	Kelt	Parr	Resident	Sea run	Smelt	Shad	Eels	Stickle-backs	Grilse	Salmon	Total	Resident	Sea run	Eels	Stickle-backs	Shad	No.	Mortalities**
1971	5734	185	434	135	0	108	3	91	0	427	305+	732	0	2	0	0	0	-	-
1972	11906	210	431	207	13	181	52	197	1	309	9	318	0	1	0	0	0	60	4
1973	8484	95	250	428	0	363	5	96	44	555	29	584	0	3	1	2	0	206	3
1974	12055	302	267	593	216	539	3	574	338	399	3	402	1	3	0	0	0	83	0
1975	9636	201	127	733	125	610	0	95	145	631	1	632	5	0	0	0	0	223	10
1976	6259	208	148	17	391	926	0	30	16	520	0	520	0	0	0	0	0	100	0
1977	9640	298	358	373	0	354	12	65	26	362	3	365	12	0	0	0	0		
1978	13071	210	899	1000	0	527	2	69	22	293	1	294	17	0	0	0	0		
1979	9400*	1	235	109	0	53	0	1	21	1578	0	1578	9	0	0	0	4		

*Estimated; actual recorded migration, 8340 smolts.

**Mortalities included in total.

+Incorrect sizing suspected.

Table 73. Timing of the Atlantic salmon adult and smolt migration at the Western Arm Brook counting fence, 1971-79.

Year	First smolt	First adult recorded	Smolt Peak migration	Adult Peak migration	Last smolt	Last adult recorded	Period of operation
1971	28 May	22 June	06 June - 12 June	04 July - 10 July	10 July	26 Aug.	28 May - 29 Sept.
1972	04 June	04 July	25 June - 01 July	16 July - 22 July	09 Aug.	17 Sept.	26 May - 22 Sept.
1973	29 May	18 June	10 June - 16 June	15 July - 21 July	20 July	13 Sept.	27 May - 15 Sept.
1974	03 June	13 July	16 June - 22 June	11 Aug. - 17 Aug.	30 July	02 Sept.	01 June - 04 Sept.
1975	23 May	29 June	13 June - 19 June	27 July - 02 Aug.	07 July	05 Oct.	23 May - 06 Oct.
1976	20 May	27 June	16 June - 22 June	08 Aug. - 14 Aug.	30 June	23 Sept.	19 May - 26 Sept.
1977	03 June	25 June	11 June - 18 June	10 July - 16 July	05 July	23 Sept.	29 May - 23 Oct.
1978	28 May	30 June	13 June - 19 June	15 July - 22 July	14 July	17 Sept.	27 May - 30 Oct.
1979	25 May	21 June	27 May - 02 June	14 July - 21 July	03 July	14 Sept.	25 May - 26 Sept.

Table 74. Weekly escapement of Atlantic salmon adults and brook trout through the Western Arm Brook counting fence, 1977-79.

Week (ending)	1977 Escapement: Atlantic salmon Grilse	Salmon	Total	Brook trout Resident	Mean water temp. (°C)	Mean water height (cm)
25-06-77	1	0	1	0	11.1	50.9
02-07-77	5	0	5	0	17.0	37.4
09-07-77	54	2	56	0	13.4	72.7
16-07-77	105	0	105	6	15.7	116.0
23-07-77	95	0	95	1	15.4	101.3
30-07-77	68	0	68	0	13.6	108.3
06-08-77	17	1	18	3	16.3	138.6
13-08-77	8	0	8	2	13.5	138.7
20-08-77	5	0	5	0	14.6	138.0
27-08-77	0	0	0	0	14.9	131.1
03-09-77	1	0	1	0	14.7	142.0
10-09-77	1	0	1	0	11.3	139.6
17-09-77	1	0	1	0	8.7	159.6
24-09-77	1	0	1	0	6.6	177.1
01-10-77	0	0	0	0	6.6	192.1
08-10-77	0	0	0	0	6.4	247.9
15-10-77	0	0	0	0	4.8	219.3
22-10-77	0	0	0	0	3.5	200.7
24-10-77	0	0	0	0	2.5	197.5
Total	362	3	365	12		

Table 74. (cont'd)

Week (ending)	1978 Escapement Atlantic salmon Grilse	Salmon	Total	Brook trout Resident	Mean water temp. (°C)	Mean water height (cm)
01-07-78	1	0	1	0	12.3	50.9
08-07-78	30	0	30	0	12.6	46.3
15-07-78	65	1	66	0	16.6	31.4
22-07-78	120	0	120	9	16.4	57.4
29-07-78	44	0	44	1	16.1	44.6
05-08-78	12	0	12	2	14.3	32.4
12-08-78	4	0	4	0	15.7	29.1
19-08-78	3	0	3	0	14.0	22.1
26-08-78	2	0	2	3	13.4	32.4
02-09-78	2	0	2	0	12.5	40.6
09-09-78	3	0	3	2	9.7	64.6
16-09-78	0	0	0	0	8.0	56.7
23-09-78	3	0	3	0	7.4	44.4
30-09-78	0	0	0	0	7.6	25.5
07-10-78	0	0	0	0	5.1	26.6
14-10-78	4	0	4	0	7.7	46.0
21-10-78	0	0	0	0	6.4	45.5
28-10-78	0	0	0	0	3.7	43.0
Total	293	1	294	17		

Table 74. (cont'd)

Week (ending)	1979 Escapement Atlantic salmon Grilse	Salmon	Total	Brook trout Resident	Shad	Mean water temp. (°C)	Mean water height (cm)
23-06-79	3	0	3	0	0	14.6	16.9
30-06-79	48	0	48	0	0	12.0	16.1
07-07-79	116	0	116	0	2	14.6	17.8
14-07-79	156	0	156	2	0	16.1	18.2
21-07-79	373	0	373	6	0	14.7	25.3
28-07-79	95	0	95	0	0	17.0	25.1
04-08-79	241	0	241	1	0	16.4	30.3
11-08-79	136	0	136	0	0	14.3	35.1
18-08-79	270	0	270	0	2	14.1	38.1
25-08-79	105	0	105	0	0	15.6	39.7
01-09-79	11	0	11	0	0	16.4	36.7
08-09-79	11	0	11	0	0	14.0	36.1
15-09-79	13	0	13	0	0	10.9	51.6
22-09-79	0	0	0	0	0	10.0	57.4
Total	1578	0	1578	9	4		

Table 75. Combined angled catch, effort and catch per unit effort for Atlantic salmon on Western Arm Brook, 1961-79.

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1961	3	1	0	1	0.33	100
1962	44	38	0	38	0.86	100
1963	97	86	0	86	0.89	100
1964	171	130	0	130	0.76	100
1965	214	123	0	123	0.57	100
1966	273	219	0	219	0.80	100
1967	261	192	0	192	0.74	100
1968	298	176	0	176	0.59	100
1969	296	323	13	336	1.14	96
1970	420	294	42	336	0.80	88
1971	128	205	0	205	1.60	100
1972	100	97	0	97	0.97	100
1973	409	243	0	243	0.59	100
1974	361	124	0	124	0.34	100
1975*	155	8	0	8	0.05	100
1976*	115	32	0	32	0.28	100
1977*	107	11	0	11	0.10	100
1978*	168	22	1	23	0.14	96
1979	5	0	0	0	0.0	0

*Angling prohibited for part of the season.

ST. CHARLES RIVER

River code 5101420

Counting Fence

St. Charles River is located in southern Labrador on the southern side of St. Lewis Sound (Fig. 1). It has a drainage area of 311 km^2 with a main stem length of 45 km.

A counting fence of wood and netting was installed on the river in 1966 as part of a program to gather data on fish species and abundance in southern Labrador rivers. The fence was located approximately 91 m from the river mouth and operated from 29 June to 24 July. Both downstream and upstream migrants were enumerated, although neither count was considered to be complete (Peet 1971). Total downstream migrations consisted of 30 smolts, 15 parr, two brook trout, two Arctic charr, and one alewife. Upstream migration comprised 993 fish of which 877 were Arctic charr, 86 brook trout, and 30 Atlantic salmon. Five of the salmon were large. In addition to fish counts, data on age, weight and length of charr and salmon were taken, the details of which are available in Peet (1971). There were no angling data recorded for St. Charles River although some angling by local residents is known to occur.

SAND HILL RIVER — River code 5205820

Counting Fence

Sand Hill River is located in Labrador just south of Hamilton Inlet. It flows east into Table Bay near the community of Cartwright (Fig. 1). The river drains approximately 1625 km^2 and has a main stem length of 79 km.

In 1967, two counting fences were installed on the system, one on the main stem and another on a major tributary, Northwest Brook. Fence operations were in connection with the Greenland Salmon Fishery Investigation and intended to assess the Atlantic salmon population for its potential in a smolt tagging program. Unfortunately, high water discharge displaced the main fence in July and only a partial count of Atlantic salmon was obtained. During the brief operating period 554 grilse and 87 large salmon were enumerated at the main fence (Table 76). Operations at the Northwest Brook also had problems with high water and some salmon may have bypassed the counting trap. A count of 122 grilse and 16 large salmon was eventually obtained (Table 77). In addition to Atlantic salmon five additional fish species were observed at the counting fences (Table 76).

In 1968, the Sand Hill River was chosen as the site for Greenland Salmon Fishery Investigation and installation of a permanent counting fence was started on the main stem. The fence was completed in 1969 but its construction plus high water level permitted only a partial count of migrants in that year. In 1970 through to 1973 enumeration of both upstream migrants and downstream moving salmon smolts was successfully undertaken (Table 76). Smolt tagging was also conducted at the site. Migration periods are given in Table 78 and 79.

After 1973, operation of the Sand Hill River counting fence was terminated due to lack of funding and in 1978 the permanent living quarters were leased as a commercial sport fishery camp.

During the seven years of operation, extensive biological data on salmon and other fish species were collected at the site and these data have been published in Riche and Traverse (1970, 1971), Peet (1971), Murphy (1972), Traverse (1972, 1973), Murphy (1974), Pratt et al. (1974), Porter and Davis (1974), and Anderson (in preparation).

Table 76. Escapement of Atlantic salmon and other fishes on Sand Hill River, Labrador, 1967 and 1969-73.

	Upstream Migration								
Year	Atlantic salmon			Brook trout	Arctic charr	Eels	Alewife	Suckers	Shad
	Grilse	Salmon	Total						
1967*	554	87	641	55	3	1	2	195	2
1969*	911	36	947	65	56	0	0	102	0
1970	3620	139	3759	157	56	0	0	881	0
1971	3489	265	3754	98	28	0	0	438	0
1972	1877	164	2041	48	51	0	0	128	0
1973	4550	489	5039	76	13	0	0	117	1

*Partial counts

Table 76. (cont'd)

	Downstream Migration								
Year	Atlantic salmon			Brook trout	Arctic charr	Eels	Stickle-backs	Suckers	Shad
	Smolt	Kelt	Parr						
1969									2
1970	50807	17	917	407	2	262	0	4046	
1971	52607[e]	2	819	150	0	28	0	1531	3
1972	37007	4	270	130	0	129	3	8702	
1973	47727	57	634	406	0	6	6	14881	1

[e]Estimated to represent 90% of escapement.

Table 77. Escapement of Atlantic salmon and other fishes at North West Brook (tributary to Sand Hill River), Labrador, 1967 and 1969-73.

Upstream Migration

Year	Atlantic salmon			Brook trout	Arctic charr	Eels	Ale-wife	Smelt	Stickle-backs	Suckers
	Grilse	Salmon	Total							
1967*	122	16	138	1003	5220	0	0	132	1	672
1969	16	0	16	185	1359	0	0	199	0	73
1971	97	1	98	159	464	0	0	241	0	373
1972	29	3	32	173	612	0	0	0	0	13
1973	379	54	433	100	626	0	0	1390	0	1089

*Partial count.

Table 77. (cont'd)

Downstream Migration

Year	Atlantic salmon		Brook trout	Eels	Smelt	Stickle-backs	Suckers	Arctic charr
	Smolt	Parr						
1971	360	138	103	9	45	7	6	3
1973	1009	340	520	42	610	199	683	59

Table 78. Timing of the Atlantic salmon adult and smolt migration at the Sand Hill River counting fence, 1967 and 1969-73.

Year	First smolt	First adult recorded	Peak migration		Last smolt	Last adult recorded	Period of operation	
			Smolt	Adult			Smolt	Adult
1967	-	03 July	-	15 July-22 July	-	26 Aug.	-	02 July-29 Aug.
1969	-	14 July	-	03 Aug.-09 Aug.	-	27 Aug.	-	14 July-28 Aug.
1970	08 June	04 July	21 June-27 June	24 July-01 Aug.	30 Sept.	16 Oct.	08 June-17 Oct.	30 June-16 Oct.
1971	13 June	03 July	27 June-03 July	18 July-24 July	25 July	03 Oct.	13 June-03 Oct.	03 July-03 Oct.
1972	22 June	05 July	26 June-02 July	29 July-05 Aug.	30 July	11 Sept.	22 June-30 July	28 June-11 Sept.
1973	09 June	17 June	17 June-23 June	15 July-21 July	07 Aug.	18 Sept.	09 June-23 Aug.	16 June-18 Sept.

Table 79. Timing of the Atlantic salmon migrations (adult and smolt) at the North West Brook counting fence, 1967 and 1969-73.

Year	First smolt	First adult recorded	Peak migration		Last smolt	Last adult recorded	Period of operation	
			Smolt	Adult			Smolt	Adult
1967		07 July		06 Aug.-12 Aug.		01 Sept.		07 July-01 Sept.
1969		20 July				15 Aug.		19 July-28 Aug.
1971	25 June	10 July			04 July	01 Sept.	25 June-05 July	08 July-05 Oct.
1972		15 July		23 July-29 July		15 Aug.		13 July-06 Sept.
1973	15 June	22 June	17 June-23 June	08 July-14 July	03 Sept.	09 Sept.	15 June-03 Sept.	21 June-12 Sept.

Table 80. Angled catch, effort and catch per unit effort for Atlantic salmon, Sandhill River, 1953-79.*

Year	Effort (rod days)	Catch			CUE	% Grilse
		Grilse	Salmon	Total		
1963	3	6	0	6	2.00	100
1964	87	44	0	44	0.51	100
1965	116	24	32	56	0.48	43
1966	87	31	12	43	0.49	72
1967	90	14	5	19	0.21	74
Mean 1963-67	76.6	23.8	9.8	33.6	0.44	71
1968	100	10	26	36	0.36	28
1969	0	0	0	0	0.0	0
1970	115	111	2	113	0.98	98
1971	74	112	0	112	1.51	100
1972	148	219	10	229	1.55	96
Mean 1968-72	87.4	90.4	7.6	98.0	1.12	92
1973	272	519	0	519	1.91	100
1974	219	311	10	321	1.47	97
1975	0	0	0	0	0.0	0
1976	66	165	7	172	2.61	96
1977	0	0	0	0	0.0	0
Mean 1973-77	111.4	199.0	3.4	202.4	1.82	98
1978	127	100	29	129	1.02	77
1979	351	650	5	655	1.87	99

*Angling data not available before 1963.

WEST BROOK
MIDDLE BROOK

River code 5213620/5213660

Counting Fence

West Brook and Middle Brook, known as Double Brook, are located in Labrador and flows south into Groswater Bay on the north side of Hamilton Inlet. The two streams drain about 475 km^2 and have a total stream length of 155 km.

In 1967, a counting fence of wood and wire mesh construction was installed on each stream. The purpose was to enumerate adult salmon and determine if they existed in sufficient numbers to permit smolt tagging. The project was undertaken in connection with the Greenland Salmon Fishery Investigation mentioned previously in the discussion of Sand Hill River operations and detailed by Peet (1971). The fences were operated for just one season during which time 144 grilse and 10 large salmon were enumerated. The most abundant fish were determined to be brook trout with 1368 recorded. A total of 690 Arctic charr were also observed at the fences (Table 81).

Table 81. Escapement of Atlantic salmon and other fish at West Brook and Middle Brook, Labrador, 1967.

Year	Grilse	Salmon	Brook trout	Arctic charr
		MIDDLE BROOK		
1967	130	9	1149	656
		WEST BROCK		
1967	14	1	219	34

FRASER RIVER River code 5321160

Counting Fence

Fraser River is located in northern Labrador (Fig. 1). It flows east into Nain Bay and drains an area of 1606 km^2 at its inlet to Tassiuak Lake. The main stem length including Tassiuak Lake is 172 km.

In 1975 to 1979, a counting fence was installed on Fraser River to gather biological data on Arctic charr. The study was initiated because of a rapidly escalating commercial fishery for this species in the northern Labrador area and the limited information on migration patterns, growth rates and exploitation rates that was available. Information from the counting fence and commercial fishery has been published by Coady and Best (1976), Dempson (1978) and Dempson and Best (1978). Only a brief summary of these data are given here. Data from 1976 and 1978 are incomplete due to the difficulties in maintaining the fence in position under wide fluctuation in water levels in this region (Table 82).

Table 82. Escapement of Arctic charr and other fishes through the Fraser River counting fence, 1975-79.

Year	Arctic charr	Brook trout	Lake trout
1975	3952	13	
1976*	2348	9	
1977	2334	13	1
1978*	283	1	
1979	6403		1

*Partial count.

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